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## Essays and Cases.

ART. I. *Observations upon the Nature and Treatment of Parotitis Mercurialis, by* GEORGE R. MORTON, M. D. *of Coshocton, Ohio.*

In the wide range of research and discovery, which Pathological science has opened to its professors, the glandular system, in its anatomical structure, its diseases, and their remediate management, has attracted a large share of the attention of medical writers, especially of the present day. The subject has been investigated with the keenest discrimination, by men whose names stand high in our esteem, and whose talents have elicited a fund of knowledge of the most practical usefulness.—The mysteries with which early pathologists have enveloped it, are fast disappearing; and a theory more consonant with its important functions has arisen, which bids fair soon to reach perfection. But great as have been the discoveries, and essential as are the alterations which these have introduced into the treatment of glandular disorders, much yet remains unknown and uninvestigated, or at best but imperfectly noticed and understood. It is thus with the disease in question. We have searched over the works on medicine, both ancient and modern, and have looked in vain for any author, whose writings would

lead us to infer even the slightest acquaintance with it. If they have described, accidentally, any disease at all approximating to it, they have noticed it as a symptom sometimes consequent upon, and connected with "malignant and pestilential fevers;" and have stumbled over it, like Clio of old, without the least idea of its true character and interesting nature. None, however, have noticed it as a distinct and peculiar disease, *sui generis*, and as such deserving attention. As such, we intend to describe it; not as a *new* disease, but as one whose rare occurrence has rendered it unnoticed, notwithstanding its singular features, and terrible fatality. In endeavouring to introduce it to the notice of the medical profession in general, we are not anxious to arrogate to ourselves the palm of originality—but are willing and proud to rank ourselves as subalterns in the task. To our friend Washington L. Atlee, M. D., of Lancaster, Pa., belongs the honor of having first collected and arranged whatever information we may, in the following pages, present, in an inaugural Thesis, laid before the Faculty of Jefferson Medical College, in 1828. Though we differ from him in some particulars, which at a future day we may notice, yet we embrace with pleasure this occasion of testifying our sincere respect for his sterling talents and laborious research.

Nosology is now so indispensably a part of the science of medicine, both from its convenience and utility, that we are somewhat bound, as true disciples of Hippocrates, to give our subject "a local habitation and a name" among the long list of disorders to which "flesh is heir." We would, therefore, designate it by the title of *Parotitis Mercurialis*—and define it as a specific, distinct, and peculiar inflammation, originating in, and primarily affecting the parotid gland; and which, if suffered to run an undisturbed course, speedily ends in gangrene, mortification, and death. The distinctive term *mercurialis*, as our knowledge of the disease progresses, may be considered objectionable; but in the present situation, we are disposed to prefer it to any other we can at this time suggest.

*Symptoms.* Our present limited acquaintance with this truly appalling and singular inflammation, and the paucity and

unfrequency of cases, debar us from giving so full and distinct a detail of the attendant symptoms, as we could desire. We will, therefore, confine ourselves to a sketch of the most prominent, and such as cannot be easily mistaken by an observant eye, especially when considered in connection with one another. From the few cases which have fallen under our own observation, or have been communicated to us by our friends, we have never known parotitis mercurialis to exist as a primary, independent disorder, or under any other circumstance than as a sequent of other diseases, particularly *febrile*, where *mercury* has been exhibited in the process of cure. When, therefore, in cases of febrile or other disorders, (where mercury has been administered,) arrived at that stage where the patient is just lingering between disease and convalescence, he complains suddenly of a sense of swelling beneath and in front of the ear, extremely tender upon the slightest pressure, either of the finger or of the pillow, rapidly increasing into a circumscribed tumour, which is hard, painfully lancinating, and spreading anteriorly, with pain on every motion of the jaw, we may, without hesitation, set it down as a case of genuine parotitis mercurialis. The enlargement of the parts is exceedingly rapid in its advancement, and speedily involves the surrounding structure in its disease. Extending, in a few hours, over the whole size of the head, affecting the palpetræ, the base and angle of the lower jaw, and the side of the neck; it embraces in its fearful progress, the connecting cellular tissues of the neighboring parts—the periosteum, the muscles, the parenchymatous substance of the gland itself, until the whole is one agglutinated mass of inflamed and diseased matter. The skin over the tumor is red, smooth, and glossy; and, when felt by the hand, emits a heat which conveys the sensation of being pricked by needles, to the experimenter. The tension of the skin is very great, and the swelling resembles, in appearance and colour, at least in some degree, an inflamed spleen, covered by a serous membrane. As the disease advances, the pain becomes excruciating, of a lancinating, burning character: the process of deglutition becomes difficult and painful: the voice is paraphoniac: the countenance is flush-

ed and livid, and the sense of strangulation is oppressive. The tumescence having reached its acme, the pain most usually subsides, or is not complained of: the head is affected with a dull, heavy feel: the tumour itself becomes livid: deafness of the ear of the affected side; and finally, a low, muttering delirium, with other symptoms of an oppressed brain, and a sinking condition of the system, supervene. The tumour now becomes somewhat soft, and fluctuation is perceptible: a gangrenous suppuration ensues: the abscess bursts and discharges, generally in small quantities, a sero-purulent matter. Contrary to what might be expected, no mitigation of the symptoms appear: the central or glandular portion of the tumour still continues firm and hard: sloughing of the cellular tissue, resembling wet tow, takes place: and the pulse, which, in the beginning, was hard, quick, and contracted, is now small, weak, and exceedingly rapid, beating as high as 150 or 160 in a minute. The disturbed condition of the cerebral system, instead of abating is increasing, and the patient sinks from exhaustion and debility; or, in case of the abscess bursting inwardly, from strangulation. If undisturbed, the disease generally runs its course in four or five days.

Such are a few of the most prominent and characteristic features of this terrific malady, which a cursory and limited attention to the subject has enabled us to present.

We have never known it to occur during the continuance of an active ptyalism; but only when the constitutional effects of mercury had, in a great measure, subsided, or entirely ceased. An active ptyalism is, however, not unfrequently known to appear, when the tumour is about subsiding, and becoming soft and less painful. Both parotids may be similarly affected at one and the same time; but the commencement of disease in each is never simultaneous: several hours always intervene between the periods when inflammation is developed in the glands of the opposite sides.

*Rationale Symptomatum.* If we examine attentively the symptoms which our partial observations have enabled us to enumerate, we shall find cerebral derangement one of the earliest

and most lasting. This, (though probably owing, in some slight measure, to the peculiar state under which the system is laboring at the moment of attack, and during its continuance,) is no doubt chiefly caused by the direct effects of the accumulation of retarded blood, upon the substance of the brain and its meninges. The natural consequence of the rapid enlargement of the tumour is, to obstruct the free circulation of the blood in the cervical vessels, by its mechanical pressure; but the supply through the carotid arteries, is equally impeded with the exit of fluid through the jugular veins. Of course, we are obliged at once to seek further for the explanation of this symptom of engorgement; and we find it readily by adverting to the fact, that while the removal of superfluous blood by the jugular veins is much obstructed, or almost cut off by the tumour, the brain is receiving a full supply through the vertebral arteries, whose long canal protects them from any injurious impression. The brain, therefore, is subjected to violent oppressions, by the superabundant and unnatural quantity of the nutrient fluid, and, as a reasonable inference, its functions become disordered, and its energy enervated. *Deafness*, such as is attendant upon this complaint, may be produced, either by the direct effects of pressure upon the Eustachian tube, or by the paralysis of the nervous system, originating in cerebral derangement. The malcondition of the nervous system will also readily account for the *cessation of pain* on the arrival of the tumescence at its acme.—The explanation of the alteration of the voice; the sense of strangulation; the difficulty of deglutition, must all be sought for in the mechanical effects of pressure. But why does ptyalism so frequently occur towards the termination of parotitis mercurialis, especially when the disease is likely to assume a favourable issue? To answer this question correctly, we must refer to the state of the general system at the commencement of diseased action. We have distinctly stated in our exposition of symptoms, that parotitis mercurialis *never* originates during the progress of a ptyalism; and that a mercurialized condition of the body is absolutely and indispensably necessary for its existence. As far as the scope of our observation has extended, we know

of no single case, unless as connected with, or consequent upon pyrexia. Now, from the well known and distinct effects of a febrile diathesis, and of a mercurialized state of the system, upon the exhalent orifices of the secretory vessels; and from the generally received Hunterian principle, that two diseased actions of a general character, cannot co-exist at one and the same time, in the same person, we can readily perceive why ptyalism is not a symptom of the inflammation in question. In this disease, pyrexia is always present, previous to its acme, either in a general or a local form. Mercury may be exerting its specific influence, in the latter case particularly, upon other glands, while the parotid itself shows not the slightest evidence of its action; but the moment the local phlogosis subsides, it then appears.

*Diagnosis.* Fortunately for us, Parotitis Mercurialis can scarcely be confounded with any other affection of the same gland. Let this one rule be invariably borne in mind, and we can never be mistaken, that it *never* occurs as a primary disease, nor in any case can possibly exist where the system has not been under the influence of mercury in some form or other, for the cure of the previous malady. The suddenness of the attack, the extraordinary rapidity of its progress, the excessive degree of the inflammation, the acute lancinating pains by which it is attended, the general constitutional derangement, &c., all serve to point out its real and dangerous character, in contradistinction to cynanche parotidea; and the cold abscesses of the French, the critical abscesses of fevers; the only two diseases with which it can possibly be confounded, by the most Bœtian stupidity.

*Prognosis.* The prognosis in this disease, is most generally unfavorable. If 24 hours have elapsed from the period of attack, until the application of remedial agents, the condition of the patient is highly critical. Every moment of delay adds to the certainty of death. If suppuration ensues, or the collection of purulent matter cannot be induced to evacuate externally, the case is almost hopeless, and the physician need hardly resort to any other than euthanasial remedies, to soothe the suf-

ferer's last hours of agony and distress. The occurrence of a ptyalism is always favorable. The ratio of deaths from this disease, to recoveries, is, as far as we can judge, as that of four to one.

*Treatment.* In order more plainly to elucidate our therapeia, the medical treatment may be considered under three leading indications: 1st. of subduing the general pyrexial excitement when present; 2d., of procuring the speedy resolution of the tumour; and 3d., of supporting the system during collapse.

Of the 1st: general pyrexial excitement is not always attendant upon parotitis mercurialis; but sometimes it is present, and demands remedial attention. When this is the case, the usual antiphlogistic remedies must be resorted to at once. Venesection, prompt, and decisive, and carried to the extent of making a powerful impression on the system, and followed by active purgatives of a drastic nature, form the principal sanatory agents. If general nervous irritation become very violent, opiates, such as Pulv. Ipec. C., belladonna, hyoscyamus, acet. morph., &c., may be employed with some advantage. But it is to the 2d indication, that we are to turn all our attention and discrimination. We have already stated that the disease is peculiarly rapid in its progress; and proportionate to the severity of the inflammation, is the speed with which it terminates in its highly morbid character. No time should be lost—for every hour adds to the certainty of its fatal issue. So short, indeed, is the period for the employment of therapeutic agents, and in which the disease may be considered as under the control of medicine, that the delay even of a few hours may render abortive our most potent drugs, and seal the doom of the wretched victim. When, therefore, we are called to a case of this kind, our first resort should be (after the administration of anti-phlogistic means, if necessary,) the application of blister, covering the whole of the inflamed surface. As the surface of the affected parts is generally extremely insensible, it would be advisable to premise its application by some stimulent article, to excite the parts, such as hartshorn, decoct. of canthar. in spts., tereb., aq. ammon., or even in very desperate cases, nitric

acid. It is only, however, in the first 36 or 48 hours, that epispastics can be of any real service. If they fail to have the proper effect on the first application, they should be frequently renewed, and assisted by the use of leeches. Should we fail in procuring the resolution of the tumour by this practice, and suppuration becomes unavoidable, or should we, unfortunately for the patient and ourselves, be called in just as this is commencing, we must endeavour, by every tangible means, to solicit it to the external surface, and prevent that most deplorable of all issues, the evacuation of the abscess internally. For this purpose, warm emollient poultices, renewed before they cease to return their warmth, should be constantly and immediately employed. The tumour in this situation is to be closely watched; and should there be, or should there not be a pointing of the abscess, we ought to open it at once, with the caustic or the lancet, after the lapse of a few hours, preferring the *hazard* of death by debility and exhaustion, to the *certainty* of it by suffocation, should the abscess burst inwardly.

During the formation and continuance of this suppurative and gangrenous stage, it is, that our 3d indication must be imperatively and rigidly followed. To preserve the system from sinking beneath the exhaustion and collapse, we must support it by the employment of stimulants and tonics, both of a medicinal and dietetic character.

Throughout the whole course of this disorder, the bowels are in a constipated condition, and it is indispensably necessary to correct this. For effecting this object, we know of no better agent than the following:—R. sulph. sublim. oz, ss. Pot. sup. tart. dr. vi. ij.—one third of this to be given every hour, until purgation is attained. It should be employed every day.

Should the patient fortunately survive, the abscess after sloughing, is to be treated as a common abscess of any other part.

## Cases.

*Case I.* Mrs. B——— had been labouring under an attack of bilious remittent fever, and to all appearance was gradually

recovering her health, under the alterative use of sub. mer. hyd., when she suddenly complained of a soreness and swelling under the right ear, in the region of the parotid gland, attended with a slight degree of pyrexia, and stiffness of the lower jaw. None of the specific effects of mercury were at that time perceptible. Unaware of the nature of the disease, (for it was our first case,) the usual discutient and emollient remedies were applied; but the tumour, instead of yielding, rapidly progressed, until, after running the course of many of the symptoms before described, it terminated about the third day in an external rupture of the abscess. The discharge of pus was inconsiderable, and the cerebral disorder much aggravated. Large quantities of the cellular tissue, of the surrounding muscular structure, and finally, of a substance resembling the parenchyma of the parotid gland, came away by the spontaneous action of the vessels, and exhibited a horrible ulcer, occupying the region of the angle of the jaw, larger than a Spanish dollar, through which the interior of the mouth was visible. The system sank rapidly beneath the irritative fever, until the fifth day put an end at once to her disease and sufferings. It may not be inappropriate for the remarks we shall hereafter advance, to mention, that during the whole of her confinement, she occupied a large and airy chamber, and that her bed was placed near a spacious window, thro' which currents of air had free access to the affected side.

*Case II.* Was communicated by my friend, Dr. Atlee. A convict, in the prison of his county, on the 13th day from the commencement of an ordinary remittent fever, was seized with a painful swelling in the seat of the parotid gland, about the size of an English walnut. Mercury had been used extensively, but the gums were healthy, and no signs of ptyalism. On the fourth day from this swelling, the other parotid was similarly affected. The common course of stimulants, such as vol. lin., &c., and even epispastics, aided by powerful purgatives, antimonials, and the use of the scarificator and cup was resorted to; but all in vain. The pulse increased in frequency, as did also the comatose symptoms in violence, until finally, the 7th day closed the patient's life. During the period of his febrile

disorder, he was exposed to constant currents of cool air; and instead of adhering to the prescribed regimen, his access to, and use of cold water, was uninterrupted.

*Case III.* From the same source as the last, Susan C———, after a severe attack of bilious fever, which was fast yielding to medical treatment, on the 11th day of her illness, applied to her physician for advice respecting a painful swelling, which had appeared the night before, under her right ear, attended with considerable soreness upon pressure, and a frequent, contracted and small pulse. It had already attained the size of a ball two inches in diameter. A blister was immediately applied over the whole tumefaction, and a purge of sulph. sub. and pot. sup. tart. in large doses, repeated every 3 or 4 hours. On the subsequent day, it was found that the blister had not drawn well, but that the swelling had advanced but little. Another was re-applied, and the attendant symptoms of general irritation were corrected. This blister vesicated well; and on the following day, the tumefaction was checked entirely; the general and local irritation much relieved, and the excessive pain greatly abated. A tumour of the same nature was now discovered on the opposite side, and the same treatment of vesicants and purgation dispersed it by the next day. On the 6th day from the appearance of the swelling, a pointing, and some fluctuation was perceptible in it, and an emollient poultice was ordered: the next day the abscess was opened, and a small discharge of sero-purulent matter took place. On this day, the patient complained of soreness of the gums, and a ptyalism was, for the first time, observable. The poultices were continued: the strength supported by Cort Peruv. pulv., ter in die, and irritation allayed by Pulv. Ipecac. C. Sloughings subsequently occurred, and the ulcer was treated as an ordinary sore. It healed kindly, and in a few days the patient so far recovered her health, as to visit her friends. In this case, during the fever, cold water was constantly employed to relieve thirst; and she was also exposed to the damp air of a water-course.

*Case IV.* The subject of this, Lewis S———, a young man of 22 years, was slowly recovering from a long and protract-

ed attack of bilious remittent, in which calomel had been freely administered, without producing its specific effect. He occupied a large room of a house long untenanted, and his bed was placed in such a position, that the air from the door was continually acting upon him; and his drinks were generally cold. When he was thought beyond all reach of danger, he was suddenly seized with a pain and soreness under the left ear, which soon became excruciating. When we first saw the tumour, it had attained a considerable size, and had involved all that side of the face in a general inflammation. The skin was extremely tense, communicated a hot, pricking sensation to the hand—was of a glossy and somewhat purple redness, and the whole system was labouring under severe irritation. As the nature of the complaint was too obvious to be mistaken, we resorted at once to vesicants, premised by stimulant embrocations; and to the constant use of purgatives of sulph. sublim., and pot. sup. tart. in large doses, every hour; with an opiate to allay irritation. In the course of 12 or 15 hours, the pain began to abate, and the swelling to decrease. The blisters were dressed with unguent basil., to promote suppuration. After a few days the tumour disappeared entirely, and the patient soon regained his health. This was a marked case of the best of all terminations, that of resolution.

We might proceed to illustrate this disease with some three or four more cases, but the leading features of all were similar to those already described, though the terminations of all, owing to inexperience, were fatal.

*Causes.* From an attentive perusal of what we have here laid down, and from our cases, it must be evident that there are in this disease, two active and predisposing causes, mercury, and fever, or some other previous general affection. It is not necessary for us to enter into any prolix discussion of the respective effects of each upon the system—they are well known and generally understood. Suffice it to say, that we have in them two powerful agents, both causing a morbid impressibility, though acting in opposite directions in its production. They cannot exist at the same time; and which ever of the two pros-

trates the other, the debilitating and irritating consequences of the one, will be heightened by the present or previous effects of the other. Yet, unless the relaxing and disgorging power (not the specific effect,) of mercury prevail, we believe that the disease in question can never occur. To explain: "If mercury is exhibited in fever, so as to produce its *specific* constitutional effect, agreeably to the law of *unities*, the fever must yield; but if this point is not attained, it will, in some measure, still continue. In the first case, the vanquished fever will have added to the susceptibility of the frame; and in the latter, the mercurialized state of the body will operate in the same manner." Thus it is, then, that these two antagonising powers, acting upon a syncratistical principle, lay the body open to the action of morbific agents, from without. It is in this condition of the system, that the *exciting* or *proximate* cause, *cold*, acts with such terrible energy. In every case we have adduced, and every one we have seen, *cold*, either thro' an aqueous or aerial medium, had acted upon the part. We need enter into no laboured effort to prove, that as cold is a powerful remedy in the removal of diseases, it must, of necessity, be equally efficient in producing them. One thing, in our mind at least, is certain, and that is, that local inflammations owe their origin to this agent, far more frequently than to any other. In relation to the subject before us, we are fully convinced, from our own limited experience, that *cold*, in one or other of its forms, acts as the proximate and exciting cause in the production of Parotitis Mercurialis.

In closing our remarks upon this interesting disorder, we will enter into the following recapitulation: 1st. that parotitis mercurialis never occurs as a primary, idiopathic disease; but, perhaps, in every case after a fever: that a mercurialized condition of the system is essentially requisite for its existence; and that cold is an indispensible agent in its production. 2d. That its progress is extremely rapid: its curable condition is very limited; and that the prognosis is generally unfavorable. 3d. That the usual discutients are useless, and worse than useless, as they waste valuable time: that the only safe reliance is upon

the course we have prescribed; and that the tumour should always be opened in preference to running the hazard of internal rupture.

We cannot take leave of our subject without expressing an ardent solicitude, that so peculiar a disease may be more closely investigated by men of superior talents, and longer experience.

*Note.* Dr. Morton, in a letter to the editor, assigns the credit of the principal part of this essay, to the inaugural thesis of Dr. Atlee; but as the latter gentleman was unwilling to publish his thesis, we have taken upon ourselves the responsibility of publishing it under its present form. Cases of this kind, we think, are unfrequent: but we have met with one or two, somewhat analogous, under circumstances very similar. They occurred in old and debilitated habits, at the close of an attack of bilious fever, in which calomel had been administered, not very liberally, but to a greater extent than we would again be willing to give it under similar circumstances. Very slight salivation ensued, which was suddenly arrested, and the tumour quickly appeared, excessively painful, and very tedious, but at length terminating favourably, by healthy suppuration. Some unfavorable remarks were made, though we thought unjustly, as we considered the affection owing to some idiosyncrasy, which we could neither foresee nor control,—the calomel, probably, from some accidental circumstance, having affected the parenchyma of the gland, instead of its secreting vessels. We suspected at the time, that the too early use of the quinine, by introducing a slight continued form of febrile irritation, with a red, dry tongue, had some influence in producing this result. The course pursued was, bitters, aloes and rhubarb, as a laxative, fomentations and poultices to the inflamed gland. F.

ART. II.—*History of a Sarcomatous Tumor, its extirpation, &c.*—Published by request of the Medical Board of the First Medical District of Indiana.—By WASHINGTON W. HITT, M. D., of Vincennes, Indiana.

The subject of this history is a Mrs. Holmes, of this place, aged 24 years. The previous history she gave me of her affliction is as follows:—About twelve years ago, when her system commenced its expansion, she discovered her left breast gradually to increase in size, and to continue to grow after the system had received its ultimate development; giving her no pain, and consequently no uneasiness or alarm, until after she was united in marriage to her present husband. During pregnancy she thought it increased more rapidly; and after she was delivered of her first born, its increase became more evident and alarming. A few days after the birth of the child, the gland had every appearance, as she thought, of having secreted milk; and so much distended, that medical advice was thought necessary, and was obtained.

The child was denied access to the enlarged breast, and stimulating applications prescribed with the view to suspend the secreting process. About this time she thinks a redness appeared, circumscribed to about the size of half a crown, one inch to the right of the nipple; which redness or inflammation soon gave place to suppuration and the discharge of a fluid, the color and consistency of which she does not now recollect. After discharging a few days, it entirely healed, and no perceptible change was discovered until the second accouchment. Between her first and second pregnancy her medical attendant, she states, was as assiduous as unsuccessful in his endeavors to discuss the tumor, by the exhibition of medicine internally and externally, until ptyalism was produced and continued for some time.

On Christmas last, she was delivered of her second and last child, when the tumor again resumed its progressive march, and by its accelerated action and unyielding disposition, produced in the mind of the patient the most awful apprehensions.

The following April, I first saw her, having been called to relieve her of an attack of fever; at which time the tumor was shown to me as a curiosity. And what will be thought surprising, in a subsequent part of this history, the child was then applied to the enormous breast, which, from its magnitude, looked very unlike the mamma. I then had ocular demonstration of the fact, that secretion of milk was performed; and the child's healthful aspect itself proved it to be amply supplied with the pabulum of life. The tumor at this time was not particularly examined, as it was not requested.

I did not see the patient again until the first of July following. She was then much alarmed in consequence of a circumscribed redness, the size of a crown, appearing about four inches below the nipple; and which having subsided, left, to the feel of the finger, evident fluctuation. The external appearance of the tumor was smooth, uniform, and elastic; possessing little sensibility, and slight soreness on pressure. Upon pressing the sides of the tumor with the fingers, the internal structure imparted an uneven and irregular feeling. Its largest circumference measured 32 inches, and its base 22. Its supposed weight, from 15 to 20 pounds. It was supported by a bandage from the neck, assisted by her left arm and hand, which were constantly applied beneath it. None of the neighboring glands were implicated.

Considering the circumstances of the case, the age and comparatively good constitution of the patient, I gave opinion that extirpation was not only advisable, but would be the only possible means of her salvation from an untimely grave. She did not fully determine to submit to an operation until the above opinion was corroborated by the opinions of several gentlemen now present, who did me the kindness to examine the tumor. Her mind being fully made up, the 20th of July was appointed for the operation. From an unyielding desire to undergo the

painful ordeal among her nearest kindred, from which she could not be dissuaded, she was conveyed in a carriage 22 miles north of this place, a few days previous.

Every preparation being made, my friend Dr. Somers and myself, set off on the 19th, and on our way met an acquaintance just from the patient, who stated that nature had anticipated us, and had performed the operation by the tumor's bursting and discharging. We went on however, and found the tumor collapsed, and still discharging gradually a fluid, the color and consistency of which resembled thick, rich cream.

Judging from the vessels containing the fluid, and also the condition of her clothes, there must have been at least one gallon discharged. The fluid had a pulpy feel, and peculiar smell; not offensive however. The probe could be plied in several directions, and in some it was not of sufficient length to determine its boundaries. The minds of the patient and her friends were much relieved, supposing the late occurrence would supercede the necessity of an operation. And in vain did we endeavor to convince them otherwise. We deemed it useless to insist on an operation under existing circumstances, but contented ourselves with controverting the notion, that its discharge was a sufficient reason to delay the operation; and told them it was probable she would be placed under less favorable circumstances for an operation when it would be absolutely necessary for one to be performed. After expressing our views, we passed on to Terre Haute. While there, our patient was taken with a remittent fever, and during the second exascerbation of fever, the blood vessels of the tumor gave way, and an alarming hæmorrhage ensued. A messenger was immediately dispatched, and we were hurried back to the patient. July 25th, found hor much exhausted from fever and loss of blood; and still bleeding.

In consultation with Drs. Somes, Davis, Ohowver, and Elliot, it was agreed that an operation was the only possible expedient to save her from a speedy dissolution; and that even that was extremely doubtful under existing circumstances—such as her great debility, considerable fever, the quantity of blood she had already lost, her mind agitated with fearful apprehensions, and

the tumor collapsed into a loose mass, all tending to an unfavorable prognosis. By the assistance of the above-named gentlemen, the operation was commenced in the usual way of extirpating cancerous breasts—by making two semi-circular incisions; dissecting back a sufficiency of the integuments to cover the exposed surface after the removal of the tumor. The tumor was then cautiously dissected from above downward; great care being taken to tie the arteries as they were exposed. Thus the whole tumor was carefully and entirely removed, leaving the pectoral muscle bare. The patient was then laid on the bed to recover from syncope, the flaps lying open and the whole covered with lint.

I would here state that our patient was remarkably courageous, and bore the operation with a fortitude seldom witnessed in the most extensive operating theatres. She was supported with wine and water as occasion required. After she had somewhat revived, and finding no hæmorrhage on raising the lint, the flaps were properly adjusted and retained by adhesive straps. The compress and bandage completed the dressings. She was then cheered, encouraged, and congratulated, which elicited from her a smile prospective of returning health; and all faces beamed with gratitude and thankfulness for such a deliverance.

In a few days her fever subsided; the healing process commenced, and kindly progressed. Three-fourths of the flaps healed by the first intention; and in three weeks from the day of operation, she returned to her domestic circle; when three weeks more completed the entire healing of the wound.

Viewing her situation previous to the operation, when she was prostrate beneath the arm of disease, and to all appearance on the verge of dissolution, and seeing her now, reinstated to health, family, and friends, we cannot but consider this case a striking illustration of the powerful influence of our art in ameliorating the condition of man, aad a conclusive confutation of the vulgar prejudices entertained against it by some.

*Dissection of the Tumor.*—The tumor was opened by cutting through a thick capsule, made apparently of condensed cellular substance. On its surface next the skin, the capsule firmly

adhered. The substance of which the principal part of the tumor was composed, was made up of irregular-shaped masses, in color and texture somewhat resembling the masses which compose the pancreas; and appeared to be connected with each other by a fibrous substance of a looser texture. A very small portion extending from the nipple to the clavicular margin of the tumor, bore the appearance of healthy gland. This was half an inch thick at the nipple, and gradually increased in thickness as it ascended to the margin; and composed, perhaps, one-twelfth part of the whole, separate from the fluid.

It is remarkable in this case, considering how small a portion of the whole mamma was in a healthy state, and shaped as it was, that milk was pressed from the nipple only two weeks previous to the operation. The cavity of the tumor occupied its centre, extending principally below, and three or four inches above the centre.

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*Cases of Spinal Irritation, producing and modifying the symptoms of disease*—By JAMES C. FINLEY, M. D.

In the two last numbers of the Journal, we presented our readers with a review of two works,* referring a great variety of diseases to spinal irritation, and pointing out a very simple mode of treating symptoms which have hitherto been not less perplexing to the physician, than painful and discouraging to the patient. To the class of diseases treated of by the first of these writers, our attention has been more particularly directed, on account of the greater frequency of these affections in ordinary practice. It will be recollected, that Dr. Tate, in the work referred to, asserts that hysteria, with all its varied symptoms, is invariably accompanied by derangement of the monthly evacuation, and by a tenderness of some one or more of the dorsal vertebræ; that by irritating the course of the spinal column, in the vicinity of the affected vertebræ, the distressing symptoms are generally alleviated, and that by a course of alo-

*Tate on Hysteria, and Teale on Neuralgic Diseases.

etic purgatives, with such general treatment as the particular circumstances of the case may require, the disease is entirely relieved with the restoration of the healthy condition of this secretion.

Since this work came into our hands, we have had occasion to prescribe for an unusual number of cases of this description, and, indeed, we have been led to look for symptoms of hysteria, and deranged menstruation, in many cases where, otherwise, we should never have suspected it, and to prescribe successfully for symptoms under which females had labored for years, unpitied and unregarded. The result has been, that we have come to look upon the mode of treatment recommended by these gentlemen, as one of the most valuable suggestions that have been for a long time offered to the profession.

Few practitioners, we presume, are aware how frequently this secretion, upon which so much of the comfort and health of a female depends, is deranged. Still less are they conscious, how often an irregularity so slight as to escape the suspicion of the female herself, may produce consequences so serious as to embitter her whole life. Intelligent practitioners generally appear to have inclined to the opposite view of the subject, and to have considered these derangements rather as the consequence, than the cause of general disease; and although systematic works are burdened with remedies adapted to this condition, they have been very generally prescribed, rather to satisfy the anxiety of the patient or of her friends, than from any confidence in their virtues.

Although once inclined, with many others of our profession, to adopt this opinion, we cannot avoid thinking that the contrary sentiment, so universally entertained by the sex, is more consistent with the general laws of the animal economy.

Nature has given to those organs which are directly essential to the preservation of life, so delicate a sensibility, and such extensive sympathies, as at once to render them peculiarly liable to disease, and give them a controlling influence over the rest of the system. Now, no organ—not even the stomach, *the throne of life*, or the brain, the residence of the intellectual facul-

ties—has, in this respect, been distinguished above the uterus. Not only does it impart to the woman, that physical organization, and moral and intellectual character, which prepare her to act her part in society, as the mother of her children; but although less exposed to direct causes of disease, than any other organ, it suffers perhaps, more than all the rest. This being the case, whenever it does become the seat of disease, whether it be primarily or secondarily affected, sound pathological views would expect it to become the *centre* of morbid associations, and to require a specific direction of our remedies.

Whether the remedies generally resorted to for this purpose, are calculated to effect their object, we are not qualified to decide, nor are we prepared to assign a reason for the efficacy of the one now under consideration. That it has the effect very generally we are convinced; and we feel no hesitation in asserting, that every case of hysteria, however aggravated, will be mitigated by it, and every recent case, if proper attention at the same time be paid to the primæviæ, will be promptly relieved. We shall take the liberty of presenting a few of the many cases, upon the result of which, our opinion of its efficacy, has been formed.

*Case I.* I was requested in June, 1831, to visit Mrs. A——, about 30 years of age, of full habits, and phlegmatic temperament. On my first visit, I found her laboring under the symptoms of bilious fever, combined with a severe affection of the chest. I was informed that about a week before, she had been visited by a physician, at this time absent from the city, who had bled and cupped her, and directed other suitable remedies, with considerable temporary relief. For the last three days, she had taken no medicine. A fever came on every day about noon, and lasted until late at night: considerable pain in the left side of the chest, and great tenderness in the cartilages of the ribs: cough incessant, without expectoration: pulse 120, small and weak. Mercurial and other purgatives were prescribed; cups applied to the chest, followed by a blister.

We shall not pursue the detail of the symptoms, or of the treatment. The pain in the chest was removed, and in the car-

tilages of the ribs alleviated, and the fever lost its regular remittent character; but the condition of the patient was in no way improved.

The cough continued so harrasing, that her friends supposed phthisis to be fully developed: the skin remained hot, although the patient was bathed night and day in a profuse perspiration: the tongue became clean, and of a fiery red: the strength rapidly declined: at length deafness supervened, followed after a period, by a disposition to coma, and accompanied by diarrhea. Every variety of treatment that could be suggested, had been ineffectually tried upon this person, without the satisfaction of being assured, that our prescriptions had, in a single instance, been of decided advantage. Tonics invariably did harm, in every shape, and every possible preparation of opium, was used for the purpose of mitigating the cough, without material benefit. The same remedy was equally ineffectual, in combination with astringents and absorbents, in relieving the diarrhea; it could not, however, be administered to any extent, for this latter symptom, on account of the determination to the head. Free cathartics were occasionally given, during the whole course of the disease. During the latter part of the disease, the treatment was entirely confined to alterative doses of ipecacuan and blue-mass.

Six weeks after the commencement of the disease, we met with Tate on Hysteria, and as our suspicions had been constantly directed to the suppression of the menses, as the cause of these complicated evils, the spine was immediately examined, and several of the dorsal vertebræ found extremely tender. The tartar emetic ointment was accordingly assiduously rubbed in, several times a day. In thirty-six hours, the eruption made its appearance, and the symptoms were immediately mitigated. The cough ceased as if by magic; the coma disappeared; the respiration became natural, and from this time the patient slowly and gradually recovered, without any other medicine than the occasional application of t. e. ointment, bitters, wine, and a diet accommodated to her feeble condition. Since that time, the menses have returned, and the individual has

enjoyed a degree of health to which, for years before, she had been a stranger.

It is worthy of remark, that there appears to be a very general predisposition to this form of disease, in the family of this individual. Her only sister, and three of her brothers have been liable to a similar pain in the cartilages of the ribs, (combined in the case of the sister, with other symptoms of hysteria,) so much increased by sedentary pursuits, as to compel them to give up the business to which they have been educated, for more active occupations. These have been generally relieved by suitable remedies, although they have occasionally proved very troublesome. Her sister has lately had a return of this disease; when the same tenderness of the dorsal vertebræ was found to exist, and the relief obtained by the eruptive ointment was strikingly contrasted with the tedious operation of the remedies resorted to on former occasions.

*Case II.* In July last, I was called upon to prescribe for a young lady, about 21 years of age, who had been long liable to a severe pain in the region of the heart. She informed me, that there had scarcely been a cessation of the pain for the last six years; and that it had occasionally been so excruciating, as to call for the most active treatment. She had been repeatedly bled to such an extent, as seriously to impair her general health: the most rigid diet was imposed, and blisters and eruptive plasters without number, applied over the seat of the pain, all to no purpose, the disease continuing, in spite of the remedies, and at length, gradually subsiding, without any apparent cause.—On the present occasion, the paroxysm was accompanied by a slight attack of remittent fever, and the patient was unwilling to submit to any other remedial measures, than bleeding and active cathartics. Under this treatment, the pain returned to its former condition, and I frequently heard of its existence, without being requested to prescribe for its removal. During the last month, I was again requested to visit the same person, laboring under an attack of the influenza. After the symptoms of this disease were subdued, I embraced the opportunity of examining the condition of the spine, and found considerable ten-

terness, extending from the second to the eighth dorsal vertebra. An eruptive plaster, applied over the seat of the tenderness, produced a degree of relief, which she had not before experienced for years. A second plaster was applied, when the eruption healed, and a course of aloetic pills prescribed. She is now perfectly relieved, with every prospect of a permanent cure.

*Case III.* Mrs. B. about 23 years of age, of a florid complexion, and full habits, married about two years, has been affected since her marriage with dysmenorrhea, to a most distressing extent, accompanied with many of those nervous affections which accompany this class of diseases. In August, she was confined with an attack of bilious fever, which yielded to the customary remedies, in two or three days. She was left, however, with severe headache, continuing through the greater part of the day, with an occasional disposition to faint, while the pulse retained its fulness and strength. This last symptom led me to suspect the connexion of the disease with derangement of the sexual evacuations—the spine was examined, and the dorsal vertebræ found very tender. The spine was rubbed with the tartar emetic ointment, and the bowels kept open by the pills composed of equal portions of aloes and blue mass. The headache was almost immediately relieved on the appearance of the eruption; the uterine functions were soon after restored, and she has since enjoyed a very comfortable degree of health.

*Case IV.* Mrs. F., a lady of delicate habits, and feeble health, was confined with her first child, on the 23th December. For the first week, her condition was very favorable; but on the fifth day from her confinement, the lochia was suddenly suspended, and on the day following, symptoms of mental aberration supervened, the mind at once seeming to lose every faculty, and to be oppressed with some undefined terror and anxiety.—The pulse not much affected; the tongue covered with a thick fur. About two years before, she had suffered from an affection of the liver, which had never been perfectly relieved, and during her pregnancy, her health had been frequently interrupted in a manner that had been only relieved by active pur-

gatives, and she had frequently complained of a fixed, dull pain, in the course of the ascending colon. This pain now returned, and with the other circumstances just mentioned, induced us to suspect that the present symptoms were owing to fœcal accumulation. Accordingly, the bowels were freely evacuated, by pills of calomel jalap and aloes, and this condition kept up for ten days. About this time, the sudden variation of the pulse, from 70 to 120, without any apparent cause, combined with the peculiarity of the mental affection, led us to suspect hysteria,—the spine was examined, and several of the dorsal vertebræ found tender upon pressure. An eruptive plaster was applied, and with the appearance of the eruption, the obliquity of the mental faculties was removed, and by great care, and strict attention to to the alvine evacuations, the patient was speedily restored to health.

It would be too much, perhaps, to affirm positively, that the symptoms, in the present instance, arose from spinal irritation; yet there is great reason to suspect, that there was a connexion, more or less intimate, between them.

Although the mental illusion was slight, and the symptoms comparatively moderate, this case certainly bore considerable resemblance to puerperal mania; and as the pathology of this disease is frequently very obscure, and the indications of treatment very embarrassing and uncertain, would not the condition of the spine be at all times worthy the attention of the profession? The influence of many forms of visceral disease upon the intellectual faculties, is one of the most familiar facts in the science of medicine. It is rational to believe, nor is there wanting evidence to confirm the fact, that the derangement of function and of sensibility in the same organs, produced by irritation of the nervous trunks by which they are supplied, will produce the same effect.

Dr. Tate has certainly erred in asserting, that deranged or suppressed menstruation is an invariable accompaniment of hysteria. We see it, on the contrary, frequently during pregnancy,—many of its symptoms very often attend lactation when the demands of the child are disproportionate to the health and

strength of the mother,—nothing is more common than to meet with it, especially among those who have never borne children, long after this secretion has ceased from the decline of life, and we suspect also, that it occasionally prevails as a symptom of fluor albus and prolapsus uteri. The general principle, however, undoubtedly holds good, and is even confirmed by the exceptions which may be offered to its literal construction.

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ART. IV.—*Elements of Chemistry, in the order of the Lectures given in Yale College, by* BENJAMIN SILLIMAN. Professor of Chemistry, Pharmacy, Mineralogy, and Geology.—2 vol. oct., p. 1262.

Within a very few months, several valuable works on Chemistry, have been issued from the British and American press.—The system before us, however, has the merit of being the most extensive publication, of American origin, with which we are acquainted. The well earned reputation of the author, had secured for his work, long before its appearance, a highly favorable presentiment. He had long enjoyed the reputation of originality, and of great practical skill; and his fame, in the important business of inventing and simplifying the utensils of the laboratory, was almost unexampled. He had, moreover, furnished the scientific community, with many valuable papers on philosophical subjects: and the way was thus prepared for a most flattering reception of a full treatise on his favourite science.

The first volume treats of the *imponderable agents*, in which are included, light, caloric, attraction, &c. Of *ponderable bodies*, as oxygen, nitrogen, hydrogen, alkalies, earths, simple inflammable and acidifiable bodies, (not metallic,) and their combinations with the preceding bodies.

Professor Silliman states his reasons for departing from the practice of other writers, in noticing *seriatim*, the simple substances, in the following words:—"I have not thought it best to describe the simple substances in uninterrupted succession.—Such a method does not appear to me, to present advantages

sufficient to compensate for the inconvenience of plunging, at once, into the most complex parts of the science, which must be done, if we would draw the elementary bodies from their combinations, and present them, in the beginning, in a connected view."

I do not, however, perceive the force of this objection, to what is obviously the most rational arrangement. That it is possible for a lecturer or writer, to treat the various subjects of Chemistry, in such a progressive manner, as that the law of passing from the known to the unknown, shall never be violated, no one will presume to affirm. But as it is obviously correct, to teach a child the alphabet, before the spelling book is placed in his hands, so it seems to me, to be equally proper, to discuss the nature of simple bodies, before an effort is made to investigate the character of compounds, whose constituents have not been, as yet, under examination.

We object also, to the method pursued, in relation to the class of bodies, called *salts*; and the mistake now referred to, obtains in the second volume, to a greater extent, than in the first. Here, however, the author is not alone, for the fault is one of very general occurrence. Thus, instead of going regularly through the history of the alkalies and earths, and noticing all their saline compounds, in one chapter, we find ammonia, potash, and soda, treated of, in one place, and their salts scattered through the volume, as if there was no natural relation between them.

We prefer greatly a plan, very different from that of our author. Thus, after examining oxygen and nitrogen, treat of the atmosphere; notice hydrogen, and then examine the properties of water; then the compounds of oxygen and nitrogen, embracing the several acids, thence resulting. Then carbon, and its compounds, with oxygen, nitrogen, and hydrogen, and so on of all the simple substances. In this way, we become acquainted with all the acids, and are prepared to examine the metals.—Let the alkaline and earthy metals be first examined, in connection with their oxydes and salts; thus, in treating of potassium, notice its combinations with oxygen, and then the various salts

resulting from the union of potash, with the several acids; and thus let the whole catalogue of metals be investigated. I am sure, from some little experience in teaching, that this method is better calculated to advance the student, than any other with which I am acquainted.

There is so much force in the *Rules of philosophising*, page 173, vol. 1st, that we venture to insert the remarks, without abbreviation or comment.

1. GOD IS THE FIRST CAUSE OF EVERY THING.

(*a*) *All our observations, experiments, and reasonings, make us acquainted only with second causes.*

(*b.*) *The proximate cause of an effect, is the only immediate antecedent to the event, or which is principally operative in producing it.*

(*c.*) *To every proximate cause, there may be another proximate cause, and to that cause another; but the series will end at last in the power of the Creator, in immediate agency; and this will still be the fact if we discover ever so many proximate causes, constituting a series of chain, apparently endless.*

(*d.*) *When we have classified similar phenomena, and have discovered their modus operandi, we say that we have found out the law that governs them;* but still this harmony of facts and operations, we must trace to the same source.

(*e.*) *Natural science is to be studied by observing facts, and making experiments, and then drawing conclusions;* this is the inductive or Baconian method of reasoning and is the foundation of a legitimate theory. An experiment is nothing but the exhibition of a fact.

(*f.*) *Hypotheses may be introduced in the absence of true theory founded on induction;* but they can be admitted only provisionally, until something better can be done.*

(*g.*) We will add from Sir Isaac Newton, that "*we are to admit no more causes of natural things, than such as are both true and sufficient to explain their appearances.*"

(*h*) "*Therefore, to the same natural effects we must, as far as possible, assign the same causes.*"†

(*i.*) *The range of human reason is the whole extent of second causes.*

(*j.*) *The final reason of a particular law is sometimes discovered by us,* and always magnifies the author. The unvarying proportion of oxygen gas in the atmosphere, and the means by which it is probably sustained; the exception in the expansion of water between 32° and 40°; the phosphorescence of marine animals, and of fish generally,

*See Lord Bacon's Novum Organum, and De Augment. Scientiarum.
†Principia, Vol. II, Ed. 1803.

in the ocean, and the circulation of fluids and of aeriform bodies in currents, to equalize temperature, are striking instances among multitudes that might be adduced.*

(k.) *The moral effect of physical study upon every mind which has been correctly disciplined, is altogether happy, and augments the vigor of every proper feeling.*—It is not, however, to be denied, that an opposite effect is sometimes produced upon certain minds; but this is the fault of the individual, and not of the study. Even moral study sometimes produces the same effect.

(l.) *The greatest mental power and the longest life, joined with the greatest industry, can enable man to compass only a small part of universal knowledge.*—Of this, the wisest and the greatest men are the most sensible. Newton was not more distinguished for his vast powers and acquirements, than for his singular modesty. The important suggestions at the end of his optics are in the form of queries. The whole amount of the knowledge of such a man, compared with all that a savage knows, is indeed great; but, compared with universal knowledge, it is an evanescent point."

Professor Silliman is correct in affirming, "that much may be done, in chemical investigation, by cheap and simple means." He informs us, "that Dr. Priestley's implements were gun barrels, tubes, flasks, vials, and corks; and yet few men have ever made more discoveries." We recollect, distinctly, the paucity of articles employed by Professor Cooper, who, as an instructive lecturer, has never been excelled in this country. Indeed, it has occurred to us, in more than one instance, that the splendour of apparatus, was designed to supply the place of an easy and felicitous method of instruction. It is certainly an advantage to an apt teacher, to have ample implements, so that he may be able to select such as may be most suitable. But it is equally certain, that the glare and lustre of costly utensils, cannot compensate for defective, half digested, and crude instruction.

Much exception was taken to the volume now under consideration, because of its servile imitation of Professor Hare's "Compendium," by some individuals, who find it easier to object, than to project. There is to be sure, an extensive system of copying apparent, especially in relation to plates of new in-

*Paley's Natural Theology.

struments, and of novel modes of manipulation. But, there is also evinced the most ingenuous spirit of acknowledgment, and in no instance is the author's name withheld. And let me inquire, what writer in Chemistry has not adopted the very course complained of? Is it practicable for every new treatise-maker, to give new diagrams, or to present original views? If our forthcoming works were thus restricted, they would be *only* forthcoming, and would never see the light. But if I mistake not, there are several of the implements, noticed in the volume before us, and for which credit is given to Dr. Hare, which ought to be regarded in the light of a joint stock, between that gentleman and our author. Certainly, the large *pneumatic cistern*, and to some extent, the *compound blowpipe*, are of this character. As a most barefaced larceny has been attempted, in relation to the last named instrument, and as the coadjutors in this unprincipled business, seem indisposed to do justice, though often reproved, it is with peculiar pleasure, we quote, at length, the testimony of a competent witness in the case. Professor Silliman thus speaks in p. 224, vol. i:

"Dr. Hare *first* ascertained, that oxygen and hydrogen gases can be made to burn together in this manner; (viz. by the compound blowpipe,) that the heat thus evolved, surpasses that produced by any other mode of combustion, and that it is scarcely exceeded even by that of voltaic electricity. Being an independent, original witness to the early use of this fine instrument [1802] by its inventor, and having been in the habit of using it frequently, for several years before Dr. Clarke's experiments were published, as well as ever since; I embrace this opportunity to say, that no other name than that of Dr. Hare can be, in my view, rightfully associated with the invention of the compound blow-pipe."

But the friends of Dr. Clarke are resolved to crown him with, at least, half the glory of this discovery, and exultingly affirm, that he is entitled to the credit of inventing a more powerful machine, by forcing the mixed gasses into a *common* vessel.—This, to be sure, is a little different from Dr. Hare's instrument, but the only advantage that we can perceive in the difference is, that Dr. Clarke has had ingenuity enough to make a blowpipe, which pretty certainly insures a *blow-up* to the machine, if not to the operator. Explosions have frequently occurred in

its use; but we have yet to learn, when and where the compound blow-pipe of Dr. Hare, has met with this accident.

On the subject of acidity, Professor Silliman has the following remarks, vol. 1, page 306—"Some chemists are *now* inclining to the opinion, that no one principle can be regarded as being endowed with the peculiar prerogatives of being an acidifier; but that acidity may, and often does arise from a balanced or conjoined effect of several principles." He then refers to an ingenious discussion of this point, by Mr. Murray, in the last edition of his "Elements," (6th Edit. vol. 2, art. acids.) But if a suggestion be worth any thing, (and who does not know that discoveries have had, for their base, mere suggestions,) then it is proper that the maxim, *honor to whom honor is due*, should be observed. On this ground, the reviewer puts in his claim, and quotes from the "Memoirs of the Columbian Chemical Society," page 187, the following remarks, viz: "There is nothing, in my opinion, radically wrong, in the whole antiphlogistic system, except it be the admission of a principle of acidity. I believe acidification to be one of the simplest and most intelligible processes in nature or art. What is an acid but an assemblage of several kinds of matter, so arranged, as to constitute an homogeneous compound? And is it asked, to what I attribute the difference in acids? I answer, it is dependent on the variation in quantity of the different matters entering their composition. It has been conjectured, and that with some probability, that all matter was originally resolvable into three great constituents, oxygen, metallic base, and electricity. Hence, if this be a true conjecture, we may attribute the immense variety in acids, to the infinite modifications of these original substances. We see something like this, on a small scale, in the different compounds of nitrogen and oxygen, and in some other cases.

Oxygen has been deemed so essential to the formation of an acid, that some acid bodies have been considered as anomalies, because oxygen could not be detected in them. Now the view I have taken of the subject will obviate this difficulty entirely. For although I believe, that oxygen does probably exist in every body, possessed of acid properties, yet I do not consider that

opinion at all impaired, by one or two apparent exceptions.—Prussic acid is said to be a compound of carbon, hydrogen and nitrogen, each of which is equally indispensable, to constitute it an acid. Now, one of these is as much entitled to the appellation of *acidifying principle* as the other, if such a term were at all philosophical." The above remarks were part of an *Analysis of Professor Coxe's Essay on Acidification and Combustion*, published in the year 1813, and agreeing precisely with the reviewer's statement, in his *Inaugural Dissertation on Acidification and Combustion*, dated March, 1812. In the N. Y. Medical Repository, A. D. 1813, the same writer published a paper, "*to determine, wherein consists the quality or principle of any body*," in which the same points are defended. Thus, on page 125, it is observed; "those who attempt to find out the seat of a quality, (or principle) would do as well to undertake the analysis of a quality itself. It is, as we have already remarked, something produced by variety in the union and arrangement of particles." The above quotations are of older date, by several years, than the remarks of Professor Murray, already adverted to.

In noticing the alkaline metals, Professor Silliman follows the usual course, of ascribing all the praise of decomposition to Sir Humphrey Davy. I have been in the habit of regarding this subject in a light somewhat different, for the last eighteen years, and am not disposed now to change my views. When supposed revolutions are effected in science, there is a prevailing disposition, to neglect authorities, which, from the very fact of such revolutions, are classed among the *obsolete*. This has been remarkably the case, in regard to the truly philosophical chemistry of Lavoisier, which, as an examplification of genuine tact in the science, has never, in my opinion, been equalled in any age. In that excellent treatise are to be found, some important statements, on the metallic character of the earth and alkalies. I am well aware, that a part of the book, called the *Elements of Chemistry*, was not written by Lavoisier, but the whole is so entirely devoted to the antiphlogistic chemistry, as to give to the

production, a oneness of character which has justified the appellation so uniformly given to it.

In a note, at the foot of page 213, the translator says, "there are some experiments related in the Transactions of the Turin Academy, which give reason for suspecting, that soda is a modification of magnesia: this latter substance, according to the experiments detailed by Baron Born, seems to be a *metallic* oxyd. From analogy, we may presume that *potash* is also a metallic substance, in some hitherto unknown state of combination. We shall thus exclude all the alkalies from the class of simple elementary substances." In page 217, Lavoisier writes thus. "It is extremely probable that barytes, which we have just arranged with the earths, is an oxyde; for in many experiments, it exhibits properties really approaching to those of metallic bodies. It is even possible that all the substances we call earths, may be only metallic oxydes, irreducible by any hitherto known process." A section is added by the translator, *on the metallic nature of the earths*, in which, after detailing the processes by which the metallic bases of *lime*, *barytes*, and *magnesia*, were repeatedly obtained, he uses the following language: "should they eventually be confirmed by rigorous examination, a new light will be thrown on several of the most difficult parts of chemistry, by these discoveries, which have already been in a great measure predicted by the conjecture of M. Lavoisier, who supposes that those substances, which have long been considered as primitive earths, are only metallic oxydes, combined with oxygen, and that their reduction has hitherto been prevented by the attraction which subsists between them and oxygen, being stronger than that between oxygen and carbon." To this account, Baron Born adds, "that he expects soon to learn, that the siliceous and argillaceous earths are likewise metallic oxydes; and that, in this case, the whole class of earths and stones will disappear from the mineral kingdom."

There is reason to believe, that Dr. Woodhouse, formerly of the University of Pennsylvania, was the first person who supposed that potash had an inflammable base, as the result of experi-

ment. He was operating with pearlash and soot, exposed to a very high degree of heat, in a covered crucible, and perceived, that water thrown on the mixture, when quite cold, caused it to take fire. He repeated the experiment with charcoal, and the same result followed. He had never seen potassium, nor heard of it; but who can now entertain a doubt, but that he actually produced that substance, and that the combustion which occurred under his notice, was the effect so frequently seen in later times, of potassium on water?*

All the facts above detailed, were matters of record, in books accessible by the English philosophers, at least thirty years ago, and of course, prior to the date of Sir Humphrey Davy's alleged discoveries. I say *alleged* discoveries, for I go on the justly established principle, of *rendering to Cæsar the things that are Cæsar's*. I admit cheerfully, that Sir Humphrey did very much to unfold the true character of the alkalies and earths; and am disposed to award him the meed of praise on all suitable occasions; but I hesitate not to affirm, that it was ungenerous and unworthy of the character of a philosopher, to treat with silent contempt, all that had been done in the premises, by men devoted to science, at a period anterior to the time, when he announced to the world the result of his labours. Nor does it better become the admirers of that philosopher, to persist in a similar neglect of the actual achievments of Lavoisier, and the advocates of his system, and to detract from their merits, by throwing around Sir Humphrey Davy's fame, a light, which owes a part of its brilliancy, at least, to the previous labors of equally devoted men. Again and again have I searched in new chemical works, to find a recognition of the facts I have endeavoured to bring to public view, but in vain, and I have been forced to the conclusion, that their authors had never read the *Elements of Lavoisier* with that attention which they obviously merit, or that so long a period had elapsed since the perusal, that the contents were wholly effaced from their memories. The best advice that I can give them in this matter is, to take up the book again, and to read it attentively and thoroughly, and then

*Vide Nicholson's Journal, page 440.

to determine whether the basis of chemical science, as it came from Lavoisier's hands, is radically changed by all that Sir Humphrey Davy has done.

I am fully aware of the operation of the chloridic theory, and of the supposed influence of iodine, bromine and fluorine on the system of Lavoisier; but in all this, I see nothing but an extension of that system: nothing which Lavoisier, were he now alive, might not incorporate with his Elements, after having made a few trivial alterations. And while Dr. Ure indulges a morbid fancy,* about "the easy credulity with which the fictions of the Lavoisierian system have been received and propagated," I am of opinion, with Professor Silliman, that the views of the French philosopher, "remain substantially correct, and include all the cases (of combustion,) that mankind in general are acquainted with; although it is necessary to give extension to the idea of combustion, so as to embrace the action at least of chlorine, and perhaps, to some extent, of iodine and bromine."

Is there not reason to suppose, that the present state of things may be of ephemeral duration? If the general principles, and well known facts of the science, warranted the Lavoisierian chemists in the conjecture, that the earths and alkalies were metallic, have we not equal cause, at this moment, for doubting, in respect to the alleged elementary nature of chlorine, bromine, fluorine and iodine? I think it would require more than ordinary credulity, to inspire a negative reply. With great propriety has Dr. Paris cautioned medical men against the introduction into prescriptions, of the terms chloride, proto-chloride and bi-chloride, because of the great probability, that chlorine may yet prove to be a compound.† Discovery in our science, is only in its infantile state, and we hesitate not to advance the opinion, that in less than a century, the list of simple substances will undergo a retrograde movement, and finally fall to the numerical standard of the ancient philosophers.

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*See Dictionary of Chemistry, 1831.

†See his Pharmacologia.

In giving a full treatise on Chemistry, it is fair to state the whole truth, where facts are in our possession. And, in writing such a work, we should be as little disposed to notice the facts in Lavoisier's Elements, respecting the metallic nature of the earths and alkalies, and to be silent in regard to the labors of Sir Humphrey Davy, as to pursue the fashionable course which we have ventured to condemn. And if it shall ever fall to the lot of the reviewer, to add another to the large catalogue of Chemical books already before the public, he pledges himself to do justice to the Lavoisierian school, in the matter now complained of, while it will be his pleasure to give the just meed of praise to every deserving candidate for fame.

In his second volume, our author evinces the character of the student, to very great advantage. His copious and highly interesting notes and references, are proofs of devotion to the object before him. And as a whole, the volume may be pronounced one of the very best chemical works in the English language. It brings the science down to the time of its publication, in its most perfect and complete form. The portion devoted to vegetable chemistry is peculiarly interesting, containing not only all the facts that could be gleaned from the French and English journals, but also the valuable experiments and results of our American *pharmaciens*, who are putting forth their energies in this branch of the science, to great advantage. The attentive reader of this second volume, cannot fail to discover the happy results of the application of chemistry to the business of the Pharmaceutist. The establishment of the College of Apothecaries, in Philadelphia, gave a new impulse to the art of compounding and manufacturing remedial agents, and has furnished the world with the results of the labours of Staples, Carpenter, Smith, and others, with a sure pledge of future researches, that may bear honorable comparison with the exploits of Pelletier himself. Ought not these facts to stimulate our Western Apothecaries to a noble emulation? Is it not high time that a College of Pharmacy was instituted in Cincinnati, and in all the large and flourishing towns of the *Great Valley?*

On the subject of mineral poisons, Professor Silliman is full and satisfactory, and we would hope that the time is not distant, when our medical men will acquaint themselves with the science of Toxicology, to such an extent, as to escape the sneer of the advocate in our courts of justice. This can be effected only by acquiring a just view of the principles of chemistry, and this should be regarded as decidedly fundamental in medical education, as the study of the bones and tissues of the human body.

We cannot conclude our very brief and hasty remarks on this excellent work, without an earnest recommendation to every medical man, and student of medicine, to purchase it, if he can conveniently do so. It presents an immense body of invaluable chemical and scientific matter, to which reference may be had with great profit, even though innovations should augment in number and importance, as the science moves onward, in the rapid march of discovery. There are some slight inaccuracies and defects, which the author will not fail to correct in another edition; and as we find the gold so greatly to overbalance the dross, we are free to express our cordial approbation, well aware of the acknowledged truth, that it is easier to find fault with a good book, than to write one which may fairly aspire to mediocrity.

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ART. VI.—*Researches, principally relative to the Morbid and Curative Powers of the Loss of Blood.* By MARSHALL HALL, M. D., F. R. S., &c. &c.—Philadelphia: Carey & Hart. 1830. pp. 173.

The subject discussed in this little work possesses a very great degree of interest to the practical physician, and cannot be too emphatically urged on the attention of the profession.

Without doubt, blood-letting is one of our most efficient and valuable curative means. Its influence is pervading and powerful, and when judiciously directed, capable of effecting the

most salutary changes. It is, however, equally certain, that it is also peculiarly susceptible of great and ruinous abuse; and whilst we admit the vast benefit which it is capable of procuring, we are persuaded that there is not a remedy employed in medicine, which has been the source of so much serious and often irremediable mischief as the present one.

Much of this peculiar liability of blood-letting, to injurious consequences, arises, in a great degree, from the general inattention of physicians to the remote consequences of "loss of blood;" and still more, perhaps, to the neglect of studying the influence which various forms of disease, as well as idiosyncracy, constitutional habit, occupation, age, and other similar circumstances have, in modifying, not only the immediate, but the ulterior effects of sanguineous depletion.

The work before us is intended to illustrate all these important subjects: and we feel convinced that every practitioner, whether old or young, well may find advantage in the careful study of its contents.

The author's principal object, is to impress upon the attention of medical practitioners, the fact, that very unexpected and alarming consequences often arise from loss of blood, the nature of which is very liable to be misunderstood, and which, from being wrongly interpreted, may be readily increased to a fatal violence. He has also directed his attention especially to the illustration of "that remarkable difference in the degree of tolerance and intolerance in the loss of blood," which is found to exist in different individuals; and finally, he has endeavored to establish a distinction between "two classes of morbid affection—that of inflammations, and that of irritations." His observations on the dangerous consequences of an undue use of the lancet, appear to us highly valuable, and cannot be too strongly recommended to the attention of practitioners.

In the introductory chapter, the author illustrates the great importance of attending to the morbid effects of loss of blood, and expresses his conviction that, hitherto these topics have not sufficiently engaged "the attention of either the physiologist or of the practical physician."

"To the physiologist, the phenomena of syncope, of reaction and of sinking, present innumerable objects for his consideration of the very deepest interest. The influence of syncope on the functions of the brain, of the heart, of the capillary vessels, of the lungs, of the stomach, &c.; the phenomena of reaction, excessive or defective; but especially the phenomena and influence of the sinking state, or state of failure and decline of the vital powers, in their relation both to the nervous, the circulating, and the organic systems, severally present objects for our investigation, in a physiological point of view, at once of much novelty and the highest utility. To the physician the symptoms of reaction, so similar to those of some inflammatory affections of the head and of the heart, and the phenomena of the sinking state so similar to those of some other affections of the head, and to those of some morbid affections within the chest and abdomen, present subjects for his observation of the utmost moment in actual practice.—The diagnosis of these cases is most important, the prognosis and treatment alike, depend on it."

The effects of loss of blood, are divided into *immediate*, and *remote*. The latter, so important in their consequences, have not been sufficiently observed and investigated by the profession. They consist in the states of excessive reaction, of defective reaction, of the gradual failure of the vital powers, and of the more rapid and sudden sinking of the energies of the system, or dissolution. The phenomena of excessive reaction which sometimes result from great sanguineous depletion, may be readily mistaken by the inexperienced for an actual increased power and energy of the system, "and lead to an erroneous and dangerous employment or repetition of the lancet, when a directly opposite mode of treatment is indispensible." On the other hand, the state of actual and protracted sinking, frequently produces a series of phenomena closely resembling those which arise from sanguineous compression of the brain, or of congestion of the lungs, "so as to prompt the unwary practitioner to a still more suddenly fatal use of the lancet." These and other points relating to the excessive loss of blood, are fully illustrated in this work, and the various facts and observations which it contains cannot fail to render the practice and diagnosis in cases of this kind, much less difficult and uncertain than it must necessarily be where the knowledge which this work inculcates is not possessed.

The second chapter of the work is devoted to a cursory state-

ment of the phenomena which attend the immediate effects of loss of blood. The most common and auspicious of these effects is *syncope*. In the occurrence of fainting, the brain appears to be the organ which first suffers functional inactivity, and this impairment of cerebral function, would seem to be the direct result of deficient sanguineous circulation in the encephalon.—From the defect of the nervous influence which is necessarily induced by this inactive state of the brain, the respiratory process becomes diminished; and the heart, both from deficient quantity of blood, and deficient decarbonization of this fluid, becomes enfeebled and more or less impeded in its actions.

That the most material circumstance in the production of syncope, is deficient circulation of blood in the brain, is evident from the effect, which all causes that promote the flow of blood in the brain, have in preventing or removing fainting. If, when syncope from loss of blood, is about to supervene, the patient suddenly assumes the recumbent posture, with the head very low, so as to favor the flow of blood to the head, and impede its rapid return, the occurrence of fainting will be prevented, or its continuation arrested if it has already taken place. Vomiting, and strong and sudden emotions of mind, as anger, by determining the blood to the head, are attended with the same result.

The tendency to syncope from loss of blood, varies exceedingly in different individuals. Some will bear the loss of an extraordinary quantity of blood without fainting, whilst others will fall into this state from the abstraction of but a very small portion of blood. This difference in the power of bearing sanguineous depletion, does not appear to depend on a corresponding difference in the constitutional powers of the system; for we frequently observe very robust and vigorous individuals, who are incapable of bearing even ordinary abstractions of blood, without falling into a syncope; whilst on the other hand, many persons of a weak and delicate habit of body, bear the loss of very considerable quantities of blood without any tendency to syncope.

*Convulsions*, also, is one of the common effects of loss of blood. This, like syncope, is manifestly the consequence of

disturbed cerebral excitement. The states of inanition or exhaustion, and of repletion or fullness of the vascular system, are alike favorable to the occurrence of convulsions. Infants are much more apt to become convulsed from excessive loss of blood than adults or old people. "Convulsions occurring from blood-letting," says the author, "must be generally considered as denoting that the remedy has been used beyond the safe degree." There can be no doubt, that convulsions in the puerperal state, occasionally depend immediately on excessive sanguineous depletion; and it is particularly important, as the author observes, to distinguish these cases from those which arise from intestinal or uterine irritation.

*Delirium* is another of the immediate effects of loss of blood. Complete and protracted syncope, however, perhaps always precedes the occurrence of delirium; and this latter affection appears to be the result of inordinate reaction, and determination of blood to the brain, and not of vascular inanition in this organ. It is of the utmost importance to distinguish the delirium which sometimes occurs after excessive loss of blood, from that which arises from high febrile reaction, unaccompanied with general sanguineous inanition. The author relates several remarkable instances of alarming delirium, brought on by inordinate abstractions of blood, and preceded by deep and protracted syncope. In delirium from loss of blood, anodyne and stimulating remedies, with revulsive applications to the feet, constitute the appropriate means. In a violent case of delirium from loss of blood, the author administered fifty drops of laudanum with a drachm of spiritus ammoniæ aromaticus, with immediate good effect. In four hours after this dose was given, the delirium had subsided; but the patient remained in a state of obstinate silence, refusing to answer questions, and the pulse continued to beat 120 strokes in a minute. An ounce of brandy was then given every hour, with beef tea. "The first dose of brandy produced sleep;" and under the use of this and other supporting remedies, the patient speedily recovered.

*Coma.* Deep coma occasionally comes on as an immediate consequence of excessive loss of blood. "We may be called to

patients," says the author, "so perfectly comatose, immediately after blood-letting or hemorrhage, that we may be in doubt, for a time, whether the case be not apoplexy. The history of the case—the state of the countenance—of the pulse and of the extremities, and the other symptoms will, after a little watching, make the case clear to us." We recollect a boy about 14 years of age, whom we found in a state of profound apoplectic stupor, or rather coma. He had lost a great deal of blood by hæmorrhage from the nose, the day and night previous to the occurrence of the coma. His countenance was pale, the pulse frequent and extremely small, and the extremities cold. Synapisms were applied to the feet: a stimulating enema administered. In the course of an hour he recovered sufficiently to enable him to swallow fluid. The carbonate of ammonia and wine-whey were now administered, and under these stimulants, and the use of nourishing broths, he gradually recovered.

*Sudden dissolution.* The author relates an interesting instance of sudden dissolution from inordinate abstractions of blood. The patient was robust and muscular. He had fallen from a scaffold, and fractured several ribs. Symptoms of thoracic inflammation and pulmonary lesion soon came on. He was at first bled to the extent of 18 ounces; in six hours afterwards twenty ounces more were drawn, and a purge administered: the blood was inflammatory. Next morning was bled again to the extent of 20 ounces. At noon of the same day 20 ounces of blood more were drawn; next morning 18 ounces of blood were again ordered to be drawn. "The bleeder, however, perceiving what effect even the loss of a few ounces had, desisted from drawing any more. About two hours subseqently, Mr. Lawrence saw the patient, and concurred with Mr. Lloyd as to the propriety of the further abstraction of blood; they therefore directed 20 ounces of blood more to be drawn. The pulse after this became a mere flutter, and this man only survived a few hours."

Physicians generally, do not appear to pay sufficient attention to the fatal consequences which are apt to result from copious abstractions of blood, repeated at short intervals. In subjects

of an irritable habit, two or three copious abstractions of blood, sometimes gives rise to the reaction of inanition. If this condition is misunderstood, more and more blood is apt to be abstracted, without effecting the desired reduction of the arterial reaction, until the vital powers suddenly sink to a point of prostration from which the most potent stimuli cannot raise them.

In the third chapter, the author treats of *the more remote effects of the loss of blood;* and the first of these remote effects attended to is—

*Exhaustion, with excessive reaction.* This is decidedly the most important and interesting subject in relation to the morbid consequences of excessive loss of blood. "Exhaustion" says the author, "may assume several different characters. It may be attended with excessive or with defective reaction, or with actual sinking of the vital powers. The reaction or recovery from ordinary syncope is generally a simple return to a healthy state of the functions, or nearly so, the pulse not passing beyond its natural frequency. In cases of profuse loss of blood, on the contrary, the recovery is not quite so uniform, and the pulse acquires and retains a morbid frequency for a certain length of time; this frequency of the pulse may gradually subside, however, and be unattended by any other symptom of indisposition of any consequence. The phenomena are very different, if, instead of one full bleeding to syncope, or a profuse hæmorrhage, and even protracted syncope, the person be subjected to repeated blood-lettings, or to a continued drain. In this case, within certain limits, the pulse instead of being slow and feeble, acquires a morbid frequency, and a throbbing heart, and there are in some instances all the symptoms of excessive reaction.—This state of reaction is formed gradually, and consists at first, in forcible beating of the pulse, of the carotids, and of the heart, accompanied by a sense of throbbing in the head, of palpitation of the heart, and eventually, perhaps of beating or throbbing of the scrobiculus cordis, and in the course of the aorta. This state of reaction is augmented occasionally by a turbulent dream, mental agitation or bodily exertion. At other times it is modi-

ied by a temporary faintness or syncope. There is also, sometimes, irregularity of the beat of the heart and of the pulse."

In persons of an irritable and nervous habit of body, the symptoms of reaction from sanguineous inanition, sometimes become extremely vehement and alarming. A deep, throbbing pain in the head, with excessive sensibility of the sensorial nerves, and irritability of the brain, are apt, in such habits, to be added to the phenomena already mentioned. Great intolerance of light and sound occurs in some cases of this kind; "the sleep is agitated and disturbed by fearful dreams, and the patient is liable to awake or to be awoke in a state of great hurry of mind, sometimes almost approaching to delirium; often there are great noises in the head, as of singing, of crackers, of a storm, or of a cataract; and in some instances there is a sense of great pressure or tightness in one part or round the head, as if the skull were pressed by an iron nail or bound by an iron hoop."—The sense of approaching syncope, occasionally takes the place, for a short time, of the palpitation and throbbing of the heart. In awaking from sleep the patient is apt to experience "an overwhelming feeling of dissolution," or violent and agitated beating of the heart, with great anxiety and general agitation. Attacks of difficult and hurried breathing are apt to supervene, particularly on the occurrence of some mental emotion, or unusual corporeal exertion. "In this state of exhaustion, sudden dissolution has sometimes been the immediate consequence of muscular effort on the part of the patient, or of his being too suddenly raised from the recumbent into the erect position." We have thus given a full view of the author's very lucid description of the symptoms which sometimes attend exhaustion and loss of blood. The author relates several interesting examples of the phenomena of reaction, from a continued drain or loss of blood. The following case came under our own observation. A lady of a strong and robust frame of body, suffered very profuse hæmorrhage immediately after delivery. The loss of blood brought on a deep and protracted state of syncope, from which she recovered slowly. In three days after, symptoms of peritonites supervened, and the practitioner in attendance, bled her to

the extent of producing signs of approaching syncope; and administered an active purge. On the following morning, there was still considerable abdominal tenderness, with frequency and sharpness of the pulse, (as I was afterwards informed.) Twenty leeches were then applied over the hypogastric region, and the patient seemed to be much relieved by the depletion. After this the symptoms of peritonial inflammation gave no further disturbance. In three or four days afterwards, however, the patient was suddenly seized with violent pain in the head, with a sense of beating within the brain, and strange and distressing noises in the ears. At times, these cephalic symptoms would suddenly cease, and a feeling of sinking or faintness supervene, with extreme anxiety in the pit of the stomach; and these spells were generally followed by vehement and tumultuous beating of the heart. In this state I was called to see her. In addition to the symptoms just mentioned, I found her pulse frequent, rather full, with a peculiar jerking beat, and so compressible as to give a sensation to the touch, as if the artery were filled with air. The countenance was extremely pale, and the prolabia in appearance wholly exanguious. The feet and ankles were slightly œdematous; and there was great muscular prostration. An attempt to assume the sitting posture, during my presence, brought on a disposition to vomit and faintness, which was succeeded by palpitation of the heart, hurried respiration, and great aggravation of the disturbance in the head. The pulse at this time, might readily have been mistaken, by a careless observer, as one of increased arterial energy and excitement, calling for further depletion. Instead of such a course, however, opium, volatile alkalic, wine, and nourishing liquid diet, were ordered; and under this stimulant treatment much relief was obtained in the course of twenty-four hours; and health eventually established.

The following case, similar to the one just detailed, is given by the author.

"Mrs. ——, a delicate married person, aged 24, a week or ten days after her confinement of a still born child, was seized with pain in the lower part of the abdomen, extending to the liver, and other symptoms

which indicated inflammation of the os uteri, together with much constitutional disturbance. The case seems to have been mistaken in the beginning, so that it was allowed to become somewhat inveterate before the appropriate treatment was adopted. It was at this stage treated with leeches to the hypogastrium, cupping low in the groins, the hip-bath, aperient medicines, strict abstinence, &c. The benefit accruing from cupping over the sacrum was observed to be so decided, that recourse was had to this remedy twice or thrice a week. The disease seemed to be thus yielding in the most favorable manner, when the patient became suddenly, and quite unexpectedly affected with the effects of loss of blood, in a violent form. The quantity of blood taken by the cupping, had frequently been twenty ounces; and too exclusive attention had been paid to the disease, the state of the constitution not having been sufficiently watched. In this manner the patient became affected, all at once, after being cupped, with sudden and alarming syncope; she gasped, and became convulsed, and afterwards highly delirious. The admission of cold air, *and the administration of brandy*, gradually restored the patient to sensibility, but she remained extremely feeble. On the next morning, Mrs. —— was affected with extreme pain in the head, violent throbbing of the temples, slight delirium and sickness, and the sense of hearing was painfully acute. During the day, the pain in the head, the throbbing, and the intolerance of light and sound had increased so much with sickness, feverishness, and a frequent strong pulse, that it was apprehended that inflammation had taken place in the brain. The arm was actually tied up for bleeding; but the remonstrances of the patient, the history of the attack, and the recollection of some remarks on the subject of loss of blood, read some years before, happily led to the abandonment of this measure."

The patient, by an instinctive feeling of what would be beneficial to her, earnestly desired to have some brandy. It was given, and the result showed how disastrous would have been the further abstraction of blood. Under the use of mild and digestible diet, light cordials, rest and opiates, she gradually was freed of her disease.

These are highly instructive cases, and ought to be deeply impressed on the attention of the practitioner. We can scarcely doubt that the lancet has been frequently employed with fatal inattention or ignorance as to the true source of the symptoms of reaction and cerebral disturbance, which sometimes follow copious sanguineous depletion. Wherever manifestations of vehement reaction, and disturbance in the head come on soon after the loss of a great quantity of blood—or where such symp-

toms occur during the long continuance of a slow hæmorrhage, or very protracted menorrhogia, or hæmorrhail flux—more especially when these phenomena are attended with general prostration, and an exanguious appearance of the countenance, the utmost degree of circumspection should be used in the employment of depletory remedies. It will always be safest where a doubt may be entertained as to the true nature of the reaction, to try, in the first place, the effects of opiates and other stimulants. If the reaction be the result of inanition, more or less benefit will very speedily accrue from such remedies; should, however, the symptoms be aggravated, blood may then be confidently abstracted.

This course is the more necessary, since in cases of reaction from exhaustion, the loss of even a few ounces of blood may prove fatal; and every possible precaution ought therefore be used to avoid making a mistake in this respect.

We recollect an instance of a person whose system had become extremely drained and exhausted by a very protracted hæmorrhage from piles. His countenance appeared as if there was not a drop of blood flowing in his veins. In this state he was seized with great head-ache, frequent palpitations of the heart, and disagreeable inflammation of the conjunctiva. He applied to us for advice, and we ordered him the phosphate of iron, with infusion of colomba. He did not, however, follow our prescription, and to relieve the disturbance of his head, he, of his own accord, and without our knowledge, had himself bled. About four or five ounces of blood were drawn, which brought on a most alarming and protracted syncope. On the following morning he died suddenly, while attempting to raise himself in bed.

Under the head of *Exhaustion, with sinking*, the author has introduced many very valuable and interesting facts and observations.

"The symptoms of exhaustion *with excessive reaction*, may gradually subside and leave the patient feeble, but with returning health; *or they may yield to the state of sinking*, of positive and progressive failure of the vital powers, attended with a set of

phenomena very different from those of exhaustion with reaction." In this impaired or sinking state, the brain becomes inactive, as is manifested by obvious sensorial torpor, a tendency to dozing and stupor, and a more or less rapid supervention of a comatose condition, with heavy snoring, stertor, "and blowing up the cheeks in breathing" while sleeping. When roused from sleep, the patient appears confused, as if stunned, and "requires a moment to recollect himself, to recover his consciousness"—or he may manifest slight and transient delirium, or gazing with an indifferent stare on the objects around him for a moment, relapse again into a state of dozing. In the majority of cases of sinking after excessive reaction, from sanguineous inanition, one of the first signs of the approaching failure of the vital energies, is a peculiar "crepitus in the respiration, only to be heard at first, on the most attentive listening; it gradually becomes more audible, and passes into slight ruttling, heard in the situation of the bronchia and trachea." This is usually accompanied with manifest labor, oppression and hurry of the respiration. The alimentary canal becomes disturbed by distention from flatus, "and the command over the sphincters is impaired." When the sinking has become extremely great, the countenance assumes a cadaveric or death-like appearance, and the patient manifests great restlessness, continually changing the position of his extremities, which are cold and insensible. In this extreme state of exhaustion, a moderate degree of delirium is almost always present. Some very instructive cases illustrative of this sinking after reaction, from loss of blood, are detailed by the author.

The author observes, that "it would, perhaps, be difficult to offer any observations on the nature and cause of *excessive reaction* from loss of blood; but it is plain that the state of sinking involves a greatly impaired state of the functions of all the vital organs, and especially of the brain, *from defective stimulus.*" It appears to us, however, that the nature and cause of excessive reaction from loss of blood, is not so inexplicable as the author seems to think. We are inclined to believe, that in cases of inordinate reaction from loss of blood, there exists, in fact, no vas-

cular inanition; but on the contrary, actual repletion; and our reasons for this opinion are the following circumstances. The reaction in cases of this kind, never comes on until several days after the excessive loss of blood; and it is, indeed, chiefly in instances where there is slow and protracted hæmorrhage that the symptoms of reaction, at last supervene. Now, when we advert to the fact, that absorption is increased in proportion as the blood-vessels are deprived of their contents, we may conclude, that where by hæmorrhage or the too free use of the lancet, the blood-vessels are, in a considerable degree, deprived of their contents, absorption will be greatly accelerated, in consequence of which, the blood-vessels will be replenished by a crude and watery fluid. As the abstraction or diminution of the habitual stimulus of the blood, must at the same time have the effect of greatly augmenting the excitability of the system, we have thus all the conditions most favorable to the production of inordinate reaction—namely, a crude and irritating fluid circulating in the blood-vessels, and augmented susceptibility to the impressions of the fluid. That the blood in such cases is in the condition we have stated, is demonstrated by its appearance. It always contains a vast proportion of serum, the coagulable part being usually very small. But to return to our author.

*Exhaustion with delirium* is considered in the fourth section of this chapter. The author quotes an interesting instance of this kind from Dr. Abercrombie. A lady a fortnight after a delivery of her fifth child, was seized "with pain and deep-seated hardness in the right side of the pelvis—very tender to the touch, and accompanied by a considerable degree of fever."—By repeated topical bleeding, the disease was apparently subdued; her strength, however, remained much reduced, so that, though free from pain or fever, she was still confined to bed four weeks after the beginning of the disease. In this weak and exhausted state, "some family occurrence of a trifling nature," greatly agitated her mind. On the following morning her brain was in a state of extraordinary excitement. She talked incessantly, and screamed and struggled wildly; her pulse was small and rapid. *Leeches* were applied to the temples, and cold to the

head, and a purgative given. The symptoms were aggravated —her pulse became still more rapid and feeble, and her countenance manifested great exhaustion. The stimulant plan was now adopted; "a full glass of wine was accordingly given, and ordered to be repeated every hour." In four hours after the first dose of wine, the patient "was composed and rational—the pulse was 90, and of good strength, and from this time there was no return of the symptoms."

"I am persuaded," says the author, "that excessive loss of blood is by far the most frequent and influential source of delirium or mania, occurring in the puerperal state." Our own experience has led us to believe that, in some instances at least, this form of mania arises from the cause mentioned by the author. About four years ago, we attended a lady in her first accouchment. A portion of the placenta was attached over the mouth of the uterus, and she lost a most alarming quantity of blood during the delivery, which caused protracted syncope.—She did pretty well, however, for five or six days, though greatly exhausted. At the end of this time she began to talk incoherently, complaining, at intervals, of a distressing sensation in the head. In the course of twenty-four hours, a complete state of mania was developed. The pulse was very frequent, jerking, and somewhat small. As she had lost a great deal of blood only five or six days previous, we did not venture to use the lancet, but 20 leeches were applied to the temples, and an active mercurial purgative prescribed. In twelve hours after this, all the symptoms of the disease were very conspicuously aggravated. Full doses of camphor and hyoscyamus were now ordered, and the result was singularly favourable. Ten grs. of camphor, with four of the narcotic, were ordered every four hours. Before the time for giving the third dose arrived, the patient was tranquil, and manifested but very slight mental aberration. By the continued use of smaller doses of this mixture, and aperients, the disease was entirely removed in the course of four or five days.

*Exhaustion with coma* is but rarely met with, except in the last stage of sinking, from sanguineous inanition. In infants and

children, however, we occasionally meet with a comatose insensibility in connection with great exhaustion from loss of blood.

Dr. Abercrombie makes the following observations on this point:

"In the last stage of diseases of exhaustion, patients frequently fall into a state resembling coma, a considerable time before death, and while the pulse can still be felt distinctly; and I have many times seen children lie a day or two in this kind of stupor, and recover under the use of wine and nourishment. It is often scarcely to be distinguished from the coma, which accompanies diseases of the brain. It attacks them after some continuance of exhausting diseases, such as tedious and neglected diarrhœa; the patients lie in a state of insensibility, the pupils dilated, the eyes open and insensible, the face pale, and the pulse feeble. It may continue for a day or two, and terminate favorably, or it may prove fatal. This affection appears to correspond with the *apoplexia ex inanitione* of the older writers. It is produced by causes that exhaust gradually, and not, like syncope, by sudden and temporary causes of exhaustion. I have seen the same affection in adults: a man considerably advanced in life, in consequence of exhaustion from a neglected diarrhœa, fell into a state closely resembling coma. He was recovered from this state by the use of wine and opiates."

Upwards of 20 years ago, we were called to an old man, a farmer, whom we found in a state of comatose insensibility—with a pale and shrunken countenance, small and feeble pulse, and cool skin. We were informed, that for six weeks previous, and up to the time when he sunk into the coma, he was much harassed by diarrhœa, and that for the last ten days he had taken but little nourishment. He was naturally a man of a robust and vigorous habit of body, and until he became affected with diarrhœa, remarkably active for his age. In the small and feeble state of his pulse, bleeding, whether local or general, was out of the question; and, in truth, from our inexperience at that time, we were extremely embarrassed as to the course we should pursue. We ordered him sinapisms to the feet, frictions of the body and extremities with some stimulating liniment, and a stimulating injection. With this direction we left him, expecting to find him dead at our next visit. In the meantime, his friends, who observed some amendment from the use of the means just mentioned, gave him, from time to time, considera-

ble portions of wine, which had the effect of entirely removing the comatose affection in the course of eight or nine hours.

*Exhaustion* from excessive loss of blood, sometimes gives rise to torpor or paralysis of the optic nerve, causing more or less complete blindness or *amaurosis*. Mr. Travers has made some interesting observations on this subject, in his work on the Diseases of the Eye, and to which the reader is referred, for a detail of the circumstances attending these cases.

*In the fourth chapter* the author treats of "the effects of further loss of blood, in cases of exhaustion."

"The symptoms of exhaustion," says the author, "with reaction have, I am persuaded, frequently been mistaken for those of inflammation, or other disease of the head, or of the heart.—Under this impression, recourse has been had to the further detraction of blood by the lancet. And the effect of this practice is such as greatly to impose upon the inexperienced; for all the symptoms are, perhaps, greatly relieved. It was sometime before I could fully comprehend the nature of this fact. I had satisfied myself that in certain cases, the symptoms were those of loss of blood; and yet it appeared no less certain, that those very symptoms were relieved by the lancet. At length I discovered, by a careful observation, that the symptoms which were relieved, were those of reaction, and that the mode of relief *was by the substitution of syncope;* that the relieve endured as long as the state of faintness continued, but returned as this state gave way to the rallying and reaction of the vital powers. Another circumstance equally interesting and curious was, that within certain limits, the remedy which relieved for a time, eventually only added to the severity of the malady, for this was apt to return after a certain period, in a still more aggravated form." In exhaustion attended with reaction, the loss of a few ounces of blood, is in general, sufficient to cause syncope. During this state, and for a few hours afterwards, the symptoms of reaction are usually allayed, and though much prostrated, the patient feels better. The reaction, however, soon returns, generally with renewed vehemence; and as the system is still more ex-

hausted by the additional loss of blood, all the dangerous conditions of the case are greatly enhanced.

It is not uncommon to meet with instances like this: a person, after copious and protracted hæmorrhage, is seized with violent beating, and pain in the head, a rushing sound in the ears, great intolerance of light and sound, a frequent and active pulse, and warm skin. Blood-letting *seems* to be indicated—the arm is tied up, and the vein opened. After the loss of a few ounces of blood, the patient *faints*, and on recovery from this state, he feels much relieved, all the symptoms of cerebral disturbance being allayed. In three or four hours, however, the former symptoms of reaction return, and as relief was obtained from the use of the lancet before, a vein is again opened. The blood flows for a short time—the patient again faints, but now the vital powers are either suddenly extinguished, or a slight degree of reaction returns, from which the patient more or less rapidly sinks into the embraces of death.

"When the last bleeding has been considerable, it has, in some cases, been followed by the most dreadful gaspings, and other convulsive motions of death. It should be observed, that between the most gradual sinking, and the most sudden dissolution, as the effects of blood-letting, there is every intermediate shade, with the phenomena, of which it is of the utmost importance to be acquainted." The author has given a very interesting case illustrative of these varied phenomena. Mrs. ——, aged 30, was affected with slight influenza, during this disease; labour came on, which issued in delivery in about 15 hours. This was succeeded by slight fever, attended with "incessant cough." Forty ounces of blood were drawn during the first 24 hours, besides what was drawn by twelve leeches. On the next day, 12 ounces more of blood were drawn, and during the flow of the blood, the patient became faint, and sank to a state of exhaustion from which she never again rallied. "She became extremely feeble, and could scarcely articulate; and during the three succeeding days, there was a state of extreme exhaustion—and still a sense of load at the chest and pain of the side."

At the end of this period, the countenance was observed to change frequently, from a deep flush to great paleness—the perspiration ran down her face—the pulse was extremely frequent, with severe pain on coughing: no delirium, but agitated and hurried waking from sleep, and "distressing faintings usually came on about two or three o'clock, P. M." In five or six days after the supervention of these symptoms, "she became drowsy, and evidently more sinking"—and this state continued to increase until in the course of ten or twelve hours, the patient died. "The last blood-letting in this case," says the author, "was obviously though rather gradually fatal." A case is next detailed, in which "the fatal effect supervened immediately on the use of the lancet." We once met with an instance of this kind. The patient, a female, had lost a great deal of blood during and immediately after parturition. In three weeks after her confinement, she was anasurcous, her countenance extremely pale; the lips appearing wholly bloodless. The slightest motion or exertion to turn in bed, caused palpitation of the heart, and great disturbance in the head; and every attempt to raise the head from the pillow, caused sickness at the stomach, with a sense of approaching syncope. Notwithstanding these manifestations of exhaustion, the pulse was frequent and active. The attending physician, very young and inexperienced, regarded the state of the pulse as indicating the propriety of blood-letting. The arm was tied, the patient remaining in the horizontal posture, and about eight ounces of blood drawn, without the supervention of syncope. In about five minutes, however, after the blood was drawn, the patient suddenly turned on her back, gasped violently for a few moments, and expired.

*Chapter V*, is occupied with the consideration "of the influence which various circumstances have on the effects of loss of blood." As this subject is more fully discussed in the "*Second Part*" of this work, we omit here, entering into an analysis of the various topics which it embraces. We may observe, however, that the author does not appear to us to dwell with sufficient emphasis and earnestness on *intestinal irritation*, as a condition capable of modifying the effects of loss of blood. This is a

most important subject. Intestinal irritation exerts, often, the most extraordinary influence upon the powers of the system to sustain the loss of blood. We do not here refer to vascular or capillary irritation—a condition which approaches to the state of inflammation, but to that peculiar impression and excitement in the intestinal nerves, which certain offensive or irritating substances lodged in the alimentary canal are capable of producing.

It is perfectly well known, that the impression of irritating substances on the intestinal nerves, often causes a general nervous and vascular torpor and depression, altogether similar to the prostration which sometimes arises from concussion, or violent comminuted fracture of an extremity. This state of constitutional irritation from local injuries, and intestinal irritation, has been abundantly illustrated by Travers, Armstrong, and the author of the present work. In febrile diseases we sometimes meet with instances of unexpected failure of the vital actions, resembling true sinking, though not dependent on actual exhaustion. In such cases, the free operation of a purgative will, in general, speedily remove the symptoms of prostration, and re-establish the actions of the system. The detraction of blood in cases of this kind, never fails to increase the prostration, and may readily reduce the vital energies below the point of recovery. This constitutional depression from intestinal irritation is especially apt to occur in febrile diseases, after profuse hæmorrhage; and hence we not unfrequently meet with it in the puerperal state. Females of a nervous temperament, are most apt to suffer prostration from this cause, more especially if sufficient attention has not been paid to the due evacuation of the alimentary canal, during the latter stage of pregnancy, or soon after parturation.

From this fact, we perceive, that if symptoms of exhaustion or prostration come on some time after profuse hæmorrhage, we are not to infer at once, that it is the result, solely, of sanguineous inanition, unless, indeed, the manifestations of this condition are so decided that they cannot be mistaken. In cases which *seem* to be the direct consequence of deficient blood, the opera-

tion of a purge will sometimes do away all the alarming symptoms of prostration, by removing the sources of intestinal irritation. In order to obviate the unfavorable consequences which might ensue from the operation of a purge, when actual exhaustion is present, it will always be proper in cases, (where a doubt may exist, whether the prostration be the result of sanguineous inanition, or of intestinal irritation,) to administer stimulants, such as wine, or the carbonate of ammonia, in conjunction with the purge.

In the spring of 1829, we attended a lady in her confinement with her first child. She lost an unusual quantity of blood immediately after the birth of the child. She, nevertheless, did very well until the fourth day, when she was seized with strong chills, followed by violent fever, and much pain and tenderness in the hypogastric region. Blood was drawn to the extent of 20 ounces, a purgative adminstered, which operated well, and the nitrous powders, with calomel, prescribed. On the following day, 30 leeches were applied over the hypogastrium, and another aperient administered. By these measures she was brought to a state of convalescence by the end of the seventh day after the commencement of the fever. She continued, after this, gradually to improve, and I left off my daily attendance. About the end of the second week, I was again sent for, and I found my patient laboring under moderate febrile symptoms, attended with painful diarrhœa, great watchfulness, and a state of inquietude. The pulse was frequent, but small and tense. A mild purgative was ordered, with a diaphoretic mixture, composed of spirit. minder, vin. antim., spir. nitre, dulc and lemon syrup.

On the following morning, I found her in a very depressed condition. The extremities were cool and damp; the head confused; the pulse very small, weak and frequent; the countenance pale, attended with great anxiety, restlessness, and instead of the previous wakefulness, a very marked state of drowsiness. She also complained of a most intense pain in the heel of the left foot, although not the slightest redness or swelling could be noticed in the part; and pressure did not increase, but rather di-

minish her sufferings. There was at times much tormina, but very little alvine evacuation.

We were now informed that the day before this second attack came on, she was induced by a friend to eat a large piece of plum-pie. A full dose of castor oil, with two drachms of spirits of turpentine were now administered, which brought away an enormous quantity of exceedingly fetid feculent matter. Almost immediately after these evacuations, the symptoms of prostration and torpor were entirely removed, and under a careful regimen she recovered her health without any further difficulties.

When there is reason to believe that intestinal irritation cooperates with vascular inanition, in the production of exhaustion, *opiates* are, in general, more beneficial than the more diffusible stimulants.

*Chapter VI* is devoted to the consideration "of the effects of loss of blood on the internal organs." The author refers particularly to the effusion of serum into the cavities of the brain; and the singular tendency, in fatal cases, to the production of capillary engorgement or injection in the mucous membranes, as well as in the meninges of the brain. The experiments of Seeds and Kellie are well known. From these it appears that, when animals are killed by bleeding, the capillaries of the membranes of the brain always exhibit a degree of injection which might be mistaken for inflammation, attended with copious serous effusion into the ventricles.

It appears, even, that apoplexy may occur during great exhaustion, from sanguineous inanition. The author quotes a case from Dr. Denman, in which, after the profuse and protracted discharges of blood from a fungous growth of the uterus, and great consequent exhaustion, fatal apoplexy suddenly supervened. On dissection, the ventricles were found to contain about four ounces of blood. "This extreme exhaustion," says the author, "was clearly the immediate cause of her death, little as it might have been expected from the daily profuse discharge to which the patient had been subject."

The condition of the lungs, produced by excessive loss of blood, is compared, by the author, to the state of derangement caused in this viscus, by dividing the 8th pair of nerves. "Still there is a difference, for instead of hepatization with destruction of the texture of the lungs, there is œdema of this organ, with a clogged condition of the bronchia." When the hæmorrhage approaches to a fatal extent, the bronchia and air cells first become surcharged with mucous; more or less ædematous effusion then occurs into the pulmonary tissue, and finally, deficient arterealization from both these causes is superadded to prostrate the system, and extinguish the spark of life. In two cases of fatal hæmorrhage reported by Dr. Hodgkin, the lungs were very decidedly ædematous. These conditions will account for the great pectoral oppression and difficulty of breathing, which generally occur some time before death in slow hæmorrhages.

*In Chapter VII*, the author speaks "*of the treatment* of the various effects of loss of blood." The reader need scarcely be informed, that stimulant, anodyne, and invigorating means, are the only appropriate remedies for the various affections in question. "Syncope, reaction, and sinking, each requires its appropriate treatment. The constitutional treatment must be stimulant in syncope; anodyne or sedative in the state of reaction; and invigorating or restorative in that of sinking. When syncope assumes a dangerous form, the principal remedies are, an attention to the posture of the patient, which should be horizontal or even with the head somewhat depending, stimulants, both external and internal, and the transfusion of blood." In cases of excessive reaction from exhaustion, the appropriate means are, perfect quietude, both of body and mind—small doses of opium, or what the author prefers, hyosyamus, mild and liquid nourishment. "The tincture of hyosyamus," says Dr. Hall, "is, I think, the kindliest anodyne and sedative in these cases." Very minute portions of brandy may be added to the mild nutriment; but the use of diffusible stimulants in cases of this kind requires the utmost degree of circumspection, and they can never be used with propriety except in very small do-

ses. "It may be necessary to subdue the throbbing and pain in the head, by local blood-letting; and it is most remarkable how small a quantity of blood taken will relieve. Two or three leeches are frequently quite sufficient."

In the second appendix to the first part of this work, the author has given a very interesting account of "*A hydrencephaloid affection of infants arising from exhaustion*," and although we have already extended this article to a considerable length, we think we shall perform an acceptable service to our readers, in presenting them an abstract of this chapter.

There is a source of disorder, in infancy, less frequent, perhaps, in its operation, than the irritation of teething, and gastro-intestinal irritation and inflammation, but not less important in its consequences, and far less understood by medical men—namely, *exhaustion*. "This exhaustion has its origin, during early infancy, chiefly in diarrhœa or catharsis; in the latter periods of infancy, in the loss of blood, with or without the relaxed or diarrhœal condition of the bowels." The diarrhœa is generally caused by improper food; and the excessive catharsis is often the consequence of the too frequent administration of harsh purgatives. "The exhaustion from loss of blood usually follows the inappropriate or undue application of leeches or use of the lancet." The author declares it as his opinion, that the majority of fatal diseases during infancy, "occur from this inappropriate or undue application of exhausting remedies;" and although we are not disposed to go to this extent with our author, we are nevertheless fully satisfied, from long and close observation, that a vast amount of suffering and fatality in infancy, arises from the cause indicated by the author.

The infantile disease to which the author has more especially directed his attention, is what he denominates *hydencephaloid disease*. Its course is divided into two periods or stages. The first is characterized by morbid or excessive irritability; the second by the reverse condition of torpor.

"This morbid affection, as I have already stated, has usually been first induced by some change in diet, by which the stomach has been loaded or disordered, and the bowels, perhaps, af-

fected with diarrhœa; and this latter state has frequently been exasperated by the untimely administration of an aperient medicine. The infant becomes irritable, restless and feverish; the face flushed, the surface hot, and the pulse frequent; there is an undue sensitiveness of the nerves of feeling, and the little patient starts on being touched, or from any sudden noise; there are sighing moaning during sleep, and screaming; the bowels are flatulent and loose, and the evacuations are mucous and disordered."

If through an erroneous notion, as to the nature of this affection, nourishments and cordials are not given; or if the diarrhœa continue, either spontaneously or from the administration of medicine, the exhaustion which ensues is apt to lead to a very different train of symptoms. The countenance becomes pale, and the cheeks cool or cold; the eye-lids are half closed, the eyes are unfixed, and unattracted by any object placed before them, the pupils unmovod on the approach of light; the breathing from being quick, becomes irregular and affected by sighs; the voice becomes husky, and there is sometimes a husky, teasing cough; and eventually, if the strength of the little patient continue to decline, there is crepitus or rattling in the breathing; the evacuations are usually green, and the feet are apt to be cold. During the state of irritability, the breathing is quick; during that of the torpor, it is slower, irregular, suspirious, and finally crepitous. The author observes, that nothing is so characteristic of exhaustion in infants, as "pallor and coldness of the cheeks, with half-closed eye-lids, and irregular breathing."

Dr. Abercrombie refers to this affection of infants in the following words:

"In the last stage of diseases of exhaustion, patients frequently fall into a state resembling coma, a considerable time before death, and while the pulse can still be felt. It attacks them after some continuance of exhausting diseases, such as tedious or neglected diarrhœa; and the patients lie in a state of insensibility, the pupils dilated, the eyes open and insensible, the face pale, and the pulse feeble. I have many times seen children to be a day or two in this kind of stupor, and recover under the use of wine and nourishment."

The remedial treatment of cases of this kind, consist of means calculated to restore the healthy action of the bowels, and to support and invigorate the general energies of the system. If diarrhœa be present, minute doses of calomel, in union with prepared chalk, with an occasional small dose of tinctura opii, will, in general, suffice to remove this source of general exhaustion and disorder. To support and strengthen the system, the carbonate of ammonia, wine, brandy, and proper nourishment may be deemed indispensable. But "the young milk of a young and healthy nurse, is the remedy of most importance—in the absence of which ass's milk may be tried." Considerable benefit may be derived from stimulating frictions on the extremities; and a small blister or sinapism on the nape of the neck, will, in general, assist materially in removing the comatose stupor. "It is also of the utmost importance carefully to avoid putting the little patient in the erect position." We conclude this article by extracting from the work before us, the following case, illustrative of the affection just described.

"A little girl, aged four months, was seized with a bowel complaint; the usual medical attendant prescribed an aperient, which acted too freely. When I saw it on the second or third day of the disorder, the countenance was pale and sunk, and the cheeks cool; it started on being touched; there was a peculiar huskiness of the voice, and the pulse beat from 144 to 150. By giving brandy, the pulse was found on the succeeding day, reduced to 120, and there was some apparent amendment, although a degree of ruttling in the breathing or on coughing, was now added to the huskiness of the voice. By continuing the brandy, the cheeks became warm, and at length somewhat flushed, and the pulse rose to 140. The quantity of brandy was diminished and cautiously regulated, and the pulse very gradually fell to the natural standard.

"In this case the pallidness and coldness of the cheeks, and the state of the voice and breathing, indicated almost a fatal degree of exhaustion; the frequency of the pulse, arising from this cause, was reduced by the brandy; but it was afterwards again increased as the effect, not of exhaustion, but of the stimulus, and the cheeks recovered their warmth, and sometimes even became flushed. In another case precisely similar, the state of sinking continued in spite of every remedy, and the little infant lingered, and then expired.—I have known such a state of lingering to be continued for several days."

We have thus given a very full account of the contents of the *first part* of Dr. Hall's Book. The length to which this article has already been extended, prevents us, in this place, from entering upon an analysis of the *second part* of the work. It contains, however, many highly interesting observations "on the curative effects of loss of blood"—a subject to which we intend to devote some pages of a future number of this Journal.

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ART. VI.—*Elements of Physics, or Natural Philosophy, General and Medical, explained independently of Technical Mathematics; and containing new disquisitions and practical suggestions*—By NEIL ARNOTT, M. D., of the Royal College of Physicians.—First American, from the third London edition, with additions. By ISAAC HAYS, A. M., M. D., &c.—Philadelphia: Carey, Lea & Carey.—pp. 582.—(*Concluded from last number.*)

Our author's remarks on some of the common instruments in use, deserve attention. Many practitioners make use of these ordinary contrivances without having an adequate idea of the mechanical principles of their action. We heartily unite with him in the recommendation of the self-adjusting truss, as originally invented in England by Salmon and Ody, and as altered and patented in the United States by Dr. Hull. The shops in this city present many varieties of this instrument; but in all of them, the great principle of pressure on the hernial aperture, and on the back, are maintained, and we do not think there is much choice between those with a convex, a flat or a concave pad.

We commend to the attention of our readers, the remarks on tooth-drawing.

*The Obstetric forceps.*—As the blades beyond the joint or fulcrum are longer than the handles, the pressure on the head included in them is less than that exerted by the hand that uses them; but its degree should always be kept present to the mind of the operator.

*The vectis*, or lever, used instead of the forceps just mentioned, is a very dangerous instrument in unskilful hands. In fact, whenever it is used as a lever, in the common acceptation of the term, it is a piece of unskilful cruelty. If we suppose any part of the pelvis to be made the fulcrum of this lever, the soft parts between the bone and the instrument are bruised, not only with the whole force of the hand, but with twice or three times as much, if the resistance be so much nearer to the fulcrum than to the hand. The instrument is only safely used when the operator makes one of his hands the fulcrum, and uses the other as the power, or maks one hand answer both purposes; and then there is a resemblance between the action of the vectis and of a hook.

*The Levator*, or lever, for raising the broken and depressed portion of the skull in trepanning, has a jointed fulcrum attached to it. Care should be taken to place this fulcrum where its pressure cannot be injurious.

*The circular* or *crown saw* of the trephine, should be worked with a quick motion and gentle pressure, for the reason given at page 178, when treating of cutting instruments. The object is thereby sooner and better attained, and the head of the patient is less shaken.

For the same reason, there is less jarring, and an easier division of the bone in amputations, when a light and quick motion of the straight saw is used.

In using the amputation knife, the speed, neatness, and success of the operation, are all favored by blending the drawing or saw motion of the knife, with the pressure towards the bone.

These last observations are of a hundred similar, which might be made to prove the vital importance to a surgeon, of having familiarity with the use of tools or instruments. Perhaps a person cannot better acquire this than by practising, while young, some amusing work of carpentry. Manual dexterity, and a little readiness at mechanical contrivance, so frequently prove of importance to persons in all stations, that a great defect in systems of general education, is the not cultivating them with greater attention. If a handless or awkward man embrace the medical profession, and unfortunately attempt to practice surgery or midwifery, although possessed of brilliant intellect, he will very often fail where another would succeed.

*The Tooth Key* is an instrument found in the hands of most persons who pretend even to the lowest degree of skill in the healing art: and there is perhaps scarcely a day passing, in which teeth are not broken, and jaws splintered, and gums bruised even to sloughing, by the unskilful or awkward use of it. The common tooth key may be regarded in the light of a wheel and axle; the hand of the operator acting on two spokes of the wheel to move it, while the tooth is fixed to the axle by the claw, and is drawn out as the axle turns. The gum and alveolar process of the jaw, form the support on which the axle rolls. The common errors in tooth-drawing by the key, are these:

1st. Turning the key towards that side, where the adjoining teeth are so close that the tooth to be drawn cannot pass without either

breaking one of them or being broken itself. Sometimes two teeth are moved instead of one.

2d. Neglecting the natural inclination of the tooth. By winding the tooth round in the direction in which it already inclines, and in accordance with a bend which is generally found in it, the operation is easy and safe; but if it be drawn in the opposite way, it not unfrequently breaks or splinters the part of the jaw-bone in which it sticks.

3d. If the tooth-claw be blunt, its point may slip upon the tooth, so as to produce an action which is very apt to break the tooth.

4th. Unless the axle or fulcrum of the key be made to rest as evenly as possible on the gum, it will tear, or very much injure the gum. It should rest, if possible, over the part of the bone in which the tooth is set, for otherwise—as when a back tooth is drawn with the instrument resting on a part considerably anterior to it—the twist produced is painful, and there is danger of splintering.

A man whose studies or reflection have suggested these remarks, and who then operates leisurely a few times on the dead subjects, will often be able to give instant and safe relief to most intense suffering. And it is hardly excusable in any medical man, who may be placed where a dentist cannot be procured, to neglect acquiring a talent so easy.

Some dentists pull teeth directly out, by a strong forceps, made for the purpose; others use a forceps in the manner of a tooth key, by resting one side of it on the gum as a fulcrum. In this case the resting side is formed like the bolster of a tooth key. But much more in all cases depends on the dexterity of the operator, than on the form of the instrument.

*Steel Trusses for ruptures* are one of the blessings to suffering humanity, which modern ingenuity has supplied. From the unhealthy employment of some men in society, and the early dissipation or unnatural modes of life of others, debilitated constitutions are frequent, and are often transmitted to offspring; and one of the lamentable effects is, that weakness of the flesh forming the sides of cavities, which at particular points allows the protrusion of the living parts from within, so as to form tumors under the skin. The occurrence is called *hernia*, or *rupture:* the most common hernia is that of the intestines, through the groins.

Formerly this occurrence disabled for life. A man who had hernia was discharged from the army or navy; he could not ride on horseback, or take usual exercise; he could not lift a weight, and in a word, he often became a miserable burden to himself and others.—Now, by fitting the pad of a good steel truss to the part, the rupture is as perfectly restrained, as if the hand of a skilful surgeon were constantly there. The truss may be put on and off, with as little reflection or trouble as a part of the ordinary dress, and the man becomes again almost as fit for all the duties of life as if he were without his ailment.

The old form of the steel truss was that of a half or three quarter

hoop, so bent and tempered, that when put upon the patient, one end, which had a pad upon it, pressed with a given force on the opening by which the rupture protruded. The defects in this kind of truss are, the difficulty of making it to fit exactly; its being rather troublesome to put on and off; and its pressing disagreeably all round the body.

The other kind of truss, free from these defects, consists of a little more than half a hoop, with a pad at each end: one of the pads supports the weakness, and the other rests upon the centre of the back, to bear all the strain there, while the hoop itself reposes loosely on the side of the body. This truss may be called self-adjusting, for it almost falls into its place of itself, and needs no fastenings; the same truss fits all persons of one size, whatever their shape; and the strength may be adjusted by changing the number of plates in the spring-hoop.

*Tourniquets, crutches, splints,* &c. &c., are so simple in all respects as not to merit special notice here.

**The third part is devoted to the doctrine of fluids. We cannot refrain from extracting the following paragraphs.**

As in the animal body, from even the minutest point, a little vein endowed with living power, takes the blood which has just brought life and nutriment to the part, and delivers it into a larger vein, whence it passes into larger still, until at last, in the great reservoir of the heart, it meets the blood returned from every part of the body: so in this terrestrial globe, where the magic-moving power is simply fluid seeking its level, from every point of the surface, does the rain, which falls to sustain vegetable and animal life, and to renovate nature, glide into a lower bed, and from thence into a lower still, until the countless streams, after every variety of course, combine to form the swelling rivers, which return the accumulated waters into the common reservoir of the ocean. In the living body, the arteries carry back the blood with renewed vitality, to every point whence the veins had withdrawn it, and so complete the circulation; and in what may be called the living universe, the circulation is completed by the action of heat, and of the atmosphere, which, from the extended face of the ocean, raise a constant exhalation of watery vapour of invisible purity, which the winds carry and deposit as rain or dew on every spot.

A very slight declivity suffices to give the running motion to water. Three inches per mile, in a smooth, straight channel, gives a velocity of about three miles per hour. The Ganges, which gathers the waters of the Himalaya mountains, the loftiest in the world, at eighteen hundred miles from its mouth, is only eight hundred feet above the level of the sea—that is, about twice the height of St. Paul's Church in London; and to fall these eight hundred feet, in its long course, the water requires more than a month. The great river Magdalena, in South America, running for a thousand miles between

two ridges of the Andes, falls only five hundred feet in all that distance. Above the commencement of the thousand miles, it is seen descending in rapids and cataracts from the mountains. The gigantic Rio de la Plata has so gentle a descent to the ocean, that in Paraguay, at the distance of fifteen hundred miles from its mouth, large ships are seen, which have sailed against the current all the way, by the force of the wind alone: that is to say, which on the beautifully inclined plane of the stream, have been lifted even by the soft wind, to an elevation greater than of our loftiest spires.

A small lake or extensive mill-pond, with very uneven bottom, if suddenly emptied by a sluice or opening at its lowest part, would exhibit a vast number of pits or pools of various size and shape left among its inequalities. But supposing rain to continue falling, or frequently to occur, a remarkable change would soon be effected. In consequence of each pool discharging over its lower part, that is, sending out a streamlet, either into another lower pool, or into a channel leading directly to the sluice or opening, there would be a constant wearing of the part or side over which the water was running, that is to say, a deepening of the breach or channel, and the water in the pool would be consequently becoming shallower, while at the same time the bottom would be filling up with the sand or mud washed down by the rain, from the elevations around; and these two operations continuing, the pool would at last altogether disappear. By this change going on in every pool through the whole of the emptied mill-pond, the bottom would at last exhibit only a varied or undulated surface of dry land, with a beautiful arrangement of ramifying channels, all sloping with a precision unattainable by art, to the general mouth or estuary.—The reason that in the supposed case, and in every other, a water course soon becomes so singularly uniform, both as to dimension and descent, is, that any pits or hollows in it are filled up by the sand and mud carried along in the stream, and deposited where the current is slack; while any elevations are worn away by the action of the more rapid current which accompanies shallowness.

The peculiarly interesting subject of fluid support is treated by our author with great ingenuity, and his observations on the support which the human body receives in water, ought to be understood by every one.

The art of swimming, which is of such universal importance, depends on this support; and even the best swimmer cannot but receive pleasure and instruction in the perusal of the paragraphs which we are about to extract. The life of many an individual might have been saved by a knowledge of this art so easily acquired, and so pertinaciously retained. We think that a father who neglects having his son made an expert swimmer, commits

an error of no common magnitude in his education. So fully were the ancients persuaded of the importance of this acquisition, that no individual was permitted to enroll his name under the victorious eagles of a Roman army, who could not swim.—Our illustrious countryman, Dr. Franklin, has urged on us the necessity of educating our children in this pleasant, healthful and important art.

The human body, in an ordinary healthy state, with the chest full of air, is lighter than water.

If this truth were generally and familiarly understood, it would lead to the saving of more lives, in cases of shipwreck, and in other accidents, than all the mechanical life-preservers which man's ingenuity will ever contrive.

The human body with the chest full of air, is so much lighter than water, that it naturally floats with a bulk of about half the head above the water—having no more tendency to sink than a log of fir. That the person may live and breathe, then, it is only necessary to exert volition, so as to render the face the part which remains uppermost.

The reasons that so many people are drowned in ordinary cases, who might easily be saved, are the following:

1st. Their believing that continued exertion is necessary to keep the body from sinking, and hence their generally assuming the position of a swimmer, in which the face is downwards, and the whole head must be kept out of the water to allow of breathing. Now as a man cannot retain this position without continued exertion, he is soon exhausted, even if a swimmer, and if not, the unskilful attempt will scarcely secure for him even a few respirations. The body raised for a moment by exertion, above the natural level, sinks as far below when the exertion ceases; and the plunge, by appearing the commencement of a permanent sinking, terrifies the unpractised individual, and renders him an easier victim to his fate.

2d. From a fear that water entering by the ears may drown, as if it entered by the nose or mouth, a wasteful exertion is made to prevent it; the truth being, however, that it can only fill the outer ear, or far as the membrane of the drum, and is therefore of no consequence. Every diver or swimmer has his ears filled with water, and with impunity.

3d. Persons unaccustomed to the water, and in danger of being drowned, generally attempt in their struggle to keep their hands above the surface, from feeling as if their hands were tied while held below; but this act is most hurtful, because any part of the body kept out of the water, in addition to the face which must be so, requires an effort to support it, which the individual is supposed at the time incompetent to afford.

4th. Not having reflected, that when a log of wood or a human body is floating upright, with only a small portion above the surface, as at sea, every wave in passing must cover the head for a little time, but will again leave it projecting in the interval. The practised swimmer chooses this interval for breathing.

5th. Not knowing the importance of keeping the chest as full of air as possible; the doing which has nearly the same effect as tying a bladder of air to the neck, and without other effort will cause nearly the whole head to remain above the water. If the chest be once emptied, and if from the face being under water, the person cannot inhale again, the body is then specifically heavier than water, and will sink.

A very interesting case is given of death from compression of the chest, produced by sinking to a great depth, by which the body becomes really heavier than water, and will not again rise to the surface but for the exertion of swimming. It occurred in a stout negro, an excellent swimmer, who fell from a yard arm into the calm sea, a distance of eighty feet. The great velocity drove him deep into the sea at once. Stunned, most probably, by the fall, he was seen only to make a slight and ineffectual effort with his arms, "and was then seen gradually sinking for a long time afterwards, until he disappeared, as a black and distant speck, towards the unknown regions of the abyss." It is more than probable, that the renowned Sam Patch met his fate in a similar way, for it appears, at his last leap, he was more than usually intoxicated, and did not reach the water in his accustomed manner. The concussion was then so great, that he neglected the proper means for raising his body again to the surface.

We must be allowed to offer another extract.

It is not to be expected that every person should learn to swim; but every one who makes voyages, should have practised the easy lesson of resting in the water with the face out. The head, from the large quantity of bone in it, is a heavy part of the body, yet a little action of adjustment with the hands, easily keeps it uppermost; and there is an accompanying motion of the feet, called *treading the water*, not difficult to learn, which sustains the entire head above the surface. Perhaps the whole of the seventy passengers who were swallowed up on the sudden sinking of the Comet steam-boat near Greenock, in November, 1825, might have been saved in the boats which so soon went to their assistance, had they known the truth which we are now explaining.

In having to swim far, a man may rest on his back for a time, and resume his labour when he is somewhat refreshed.

So little is required to keep a man's whole head out of water, that many individuals, altogether unacquainted with what regards swimming or floating, have been saved after shipwreck, by catching hold of a few floating chips, or broken pieces of wood. An oar will suffice as a support to half a dozen people, if no one of the number attempts to keep more than his head out of the water; but from each wishing to have a good share of the security, it is often rendered less useful than it might be.

A common life preserver consists of strings of corks put round the chest or neck; or of an air-tight bag applied round the upper part of the body, and which can be filled by the person blowing into it through a valved pipe.

On the great rivers of China, where thousands of people find it more convenient to live in covered boats upon the water, than in houses on the shore, the younger male children have a hollow ball of some light material attached constantly to their necks, so that in their frequent falls overboard, they are not in danger.

Life boats have a large quantity of cork mixed in their structure; or of air-tight vessels of thin copper or tin plate, so that even when the boats are filled with water, a considerable part still floats above the general surface.

Swimming is much easier to quadrupeds than to man, because the common motion of their legs in walking and running is that which best supports them in swimming. Man is the most helpless creature in water. A horse can carry his rider with half the body out of the water; dogs that have never been in water, swim well on the first trial. Swans, geese, and water-fowls in general, are so bulky and light, by the great thickness of feathers under them, that they float upon the water like stately ships, moved by their webbed feet as oars.

A man in deep water may walk upon broken glass with impunity, because his weight is supported by the water.

But many men have been drowned in attempting to wade across the fords of rivers, from forgetting that the body is supported by the water, and does not press on the bottom sufficiently to give a sure footing against a very trifling current. A man therefore, carrying a weight on his head or shoulders, may safely pass a river, where without a load, he would be carried down in the stream.

**Under the head of pneumatics, Dr. Arnott makes the following observations, after having alluded to the chemical elements of the atmosphere:**

The atmospheric ocean is the great laboratory in which most of the actions of life go on, and on the composition of which they depend. A human being requires for breathing, a gallon of fresh air every minute, dying equally if deprived of it, or if confined to the same. All oth-

er animals also require fresh air, but in various proportions. And in the vegetable creation, the beautiful green leaf and delicate flower are merely broad and tender expansion of surface for the contact of the vivifying air. Animals give out to the atmosphere a substance which vegetables absorb; and vegetables, by the absorption, fit the air again for the use of animals; so that, upon the whole, in the various changes of nature, there is a perfect balancing of actions preserving the amospheric mass in a uniform state, constantly fit for its admirable purpose.

We know that this doctrine of compensation has of late years been stoutly denied. It has been asked, how is this supposed balance kept up during the winter, when of course the vegetable absorption of nitrogen is very much diminished, while no material change is effected in the animal consumption of oxygen? Late experiments have proved that the insect tribes so numerous in the summer time, are consumers of oxygen, and that the atmospheric air after having served their purposes of respiration, and returned through their spiracula, is deteriorated much in the same manner as it is after having passed thro' the lungs of the higher order of animals. This important observation removes, in a great measure, the obstacles to the belief of this beautiful supposition.

The author has exhibited in an interesting manner, the nature of atmospheric pressure on the human body.

*The animal body* is made up of solids and fluids, and is affected by the atmospheric pressure accordingly. There is a difficulty at first in believing that a man's body should be bearing a pressure of fifteen pounds on every square inch of its surface, while he remains altogether insensible to it; but such is the fact, and the reason of his not feeling the fluid pressure is its being perfectly uniform all around.—If a pressure of the same kind be even many times greater, such for instance, as fishes bear in deep water, or as a man supports in the diving bell, it equally passes unnoticed. Fishes are at their ease in a depth of water where the pressure around will instantly break or burst inwards almost the strongest empty vessel that can be sent down; and men walk on earth without discovering a heavy atmosphere about them, which, however, will instantly crush together the sides of a square glass bottle emptied by the air-pump, or even of a thick iron boiler, left for a moment by any accident, without the counteracting internal support of steam or air.

The fluid pressure on animal bodies, thus unperceived under ordinary circumstances, may be rendered instantly sensible by a little artificial arrangement. In water, for instance, an open tube partially

immersed becomes full to the level of the water around it, and the water contained in it is supported, as already explained, by that which is immediately below its mouth: now a flat fish resting closely against the mouth of the tube, would evidently be bearing on its back the whole of this weight—perhaps one hundred pounds; but the fish would not thereby be pushed away, nor would it even feel its burden, because the upward pressure of the water immediately under it would just counterbalance the weight, while the lateral pressure around would prevent any crushing effect of the upward and downward forces. But if while the fish continued in the situation supposed, the hundred pounds of water were lifted from off its back by a piston in the tube, the opposite upward pressure of one hundred pounds would at once crush its body into the tube. At a less depth, or with a smaller tube, the effect might not be fatal, but there would be a bulging or swelling of the substance of the fish into the mouth of the tube. In air and on the human body, a perfectly analogous case is exhibited. A man without pain or peculiar sensation, applies his hand closely to the opening of a tube, or to the mouth of any vessel containing air, but the instant that the air is withdrawn from within the tube or vessel, the then unresisted pressure of the air on the outside, fixes the hand upon the vessel's mouth, causes the flesh to swell or bulge into it, and makes the blood ooze from any crack or puncture in the skin.

These last few lines describe the surgical operation of cupping: the essential circumstances of which are the application of a cup of glass with a smooth blunt lip, to the skin of any part, and the extraction, by a syringe or other means, of a portion of the air from within the cup. To some minds, the exact comprehension of this phenomenon may be facilitated, by considering the similar case of a small bladder or bag of India-rubber full of any fluid, and pressed between the hands on every part of its surface except one:—at that one part it will swell, and even burst if the pressure be strong enough. So in cupping, the whole body, except the surface under the cup, is squeezed with a force of fifteen pounds to the square inch, while in that one situation, the pressure is diminished according to the degree of exhaustion in the cup, and the blood consequently accumulates there. The application of a cup with exhaustion only, constitutes the operation called *dry-cupping*. To obtain blood, the cup is removed, and the tumid part is cut into by the simultaneous stroke of a number of lancet points; and the cup is afterwards used as before, so that the blood may rush forth under the diminished pressure. The partial vacuum in the cup may be produced either by the action of a syringe, or by burning a little spirit in the cup and applying it while the momenta-

ry dilation affected by the heat has driven out the greater part of the air. The human mouth applied upon any part becomes a small cupping machine, and formerly, in cases of poisoned wounds, was used as such. Our present perfect cupping glasses, of stronger and more permanent operation, are not yet always used, as they might be, to assist in removing the poison after the bites of rabid or venomous animals.

He tells us too, that atmospheric pressure tends to keep all the parts about the joints firmly bound together. Thus, when the shoulder or other joints are luxated, no empty space is left, as might be supposed, but the soft parts around are pressed in to fill up the space. In dislocation of the hip, the deep socket of the acetabulum acts like a cupping glass, and is filled partly with fluids, and partly with soft solids. In all the joints the bones are, by the means of atmospheric pressure, kept in such steady contact that they work without noise or jarring.

In speaking of the barometer, our author has fallen into an error, that considering his depth of learning, and extent of research, we should hardly have expected. He ascribes the honor of having made that ascent in a balloon, which raised him to the greatest elevation "to which man has ever ascended above the surface of his earthly habitation," to De Luc. Now every one knows that it was not De Luc, but GAY LUSSAC, to whom this merit is due. We can scarcely suppose this to be a slip of the pen, as it is found in the *second* London edition, as well as the *third*, from which the American re-print is taken.

Our limits will not allow us to follow out the Doctor through the other branches of Physicks, contained in this volume. The last section, however, in which he lays down the "Doctrines of fluidity, in relation to animals," presents matter of the highest interest to the medical practitioner, and to the general scholar. He considers these relations apart, under the four following heads. 1st. *Circulation of the Blood;* 2d. *Respiration and Voice;* 3d. *Digestion;* 4th. *Pelvic Phenomena.* He very properly remarks, that no one can understand this section who is ignorant of those which precede it. The mass of truly valuable matter which this section alone contains, will recommend

the entire work to the particular attention of the practical enlightened physician. We cannot go into an examination of the ingenious manner in which he explains the mechanism of the circulation. We give a short extract relative to some of the means which the mechanical laws furnish us.

*Diffused pressure*, like that made by rolling a bandage round a whole limb, or by immersing the limb in fluid, must affect the circulation. The veins will be more compressed than the arteries, by reason of the distended force in them being less. Varicose veins, therefore, are usefully supported by a bandage or laced stocking. The reason why this manner of supporting assists so powerfully in the healing of ulcers on the legs may be, that the support affects the capillaries and absorbents as well as the larger vessels.

Poultices, by their weight, produce a soft compression of the parts on which they are applied; and in certain cases, may benefit by mechanically squeezing the excess of blood out of the weakened vessels.

The author has relieved the chronic inflammation of a sprained ancle, by ordering the foot and leg, covered with an oiled silk stocking, to be enclosed in a boot strong enough to support the pressure of quicksilver, and to be then surrounded by this for an hour or more.—The effect is a pressure by the fluid metal on the weak vessels, of one pound to the square inch, for every two inches of the depth of metal above the part. A height of four or five inches gives the relief expected. A much greater elevation would stop the circulation altogether. No bandage can press with uniformity approaching to this action of a fluid.

The effect of continued pressure, in removing morbid tumours of various kinds, is explicable on the same principle. The author doubts not that in such cases, pressure properly managed, would have a much more valuable remedy than is at present generally supposed. The elastic steel half-hoop, with one cushion before and another behind, lately introduced for the relief of hernia, affords an admirable mode of producing a uniform pressure of any desired force upon the female breast.

When a man stands in a bath, with the water up to his chin, there is a pressure of the water upon his body, proportioned every where to the depth (see page 242.) This pressure must produce a considerable effect on the blood vessels of the lower parts of the body. We see in this that a bath must propel the blood from all the external veins of the body towards the cavity of

the chest, which the pressure cannot reach: it is this effect which in part causes the feeling of thoracic oppression experienced by persons on first plunging into water, which feeling is usually attributed altogether to the cold.

The old practice of placing a patient in a pit, and surrounding his body with earth or sand, must have had a mechanical action of the kind now contemplated, in addition to any other influence.

## The phenomena of respiration are in many points explicable only by the laws of Physics.

That the air admitted to the chest should have the fullest action on the blood passing there, it was necessary that the spongy mass of lungs in which the blood-vessels ramify, should occupy the whole of the cavity, and be equally distributed. Now while the equable distribution is effected by the uniform elasticity or resilience which belongs to the structure of lung, the complete filling of the cavity is obtained, not by general attachments between the lungs and the ribs or sides of the chest, as might be expected, but by the following means, equally simple, and yet more perfect. The spongy mass of the lungs is completely covered by a strong adherent membrane, called the pleura, as close in its texture as a bladder: between this membrane and a similar lining of the chest, there is no air or empty space, and therefore, in the rising and falling of the ribs during respiration, this membrane remains always in contact with them, just as a bladder put into a bellows as a lining, with its mouth secured around the nozzle, is filled and emptied, and remains in contact with the interior of the bellows, in all its states of dilatation, as if there were attachments in a thousand places. This construction allows the lungs to have a singular freedom of play during all the motions of the body; a freedom farther provided for by their being divided into five portions or lobes, of which three occupy the right side of the chest, and two are in the left, the heart occupying in the left the place of the third. The right and left sides of the chest are formed into cavities quite distinct from each other by the *mediastinum*, a strong membranous partition. The mechanical disposition of the contents of the chest, as now described, is productive of certain consequences which it is important to understand,—for instance,

If a wound be made in one side of the chest so as to admit air, the lungs of that side collapse in obedience to their weight and elasticity; and when the chest afterwards enlarges and diminishes in respiration, air more easily enters and leaves the space around the collapsed lung, through the wound, than it can enter or leave the lung itself through the wind-pipe; because, in the first case, it has no force to overcome, and in the second the elasticity, weight and inertia of the lung oppose. If such a wound, therefore, were made into both sides of the chest at once, although without hurting any part within, the person unless assisted, would die of suffocation, because all the lungs would remain collapsed. The kind of assistance required in such a case, is to press the ribs down so as to empty the chest of air as much as possible, and then to keep the wounds close or covered while the ribs rise again; the air, of course, then enters by the natural road, the only one left, to fill the chest, and it distends the lung, and reaches the blood in the pulmonary vessels as usual. By preventing the breath from escaping by the mouth or nose, while straining with the muscles of the chest, as in the action of blowing, all the air which had entered by any wound in the chest,

may be expelled. In Benjamin Bell's system of surgery, which was long the manual of practitioners, from imperfect understanding of this subject, counsel was given the very contrary of that required; and of course, any patient treated accordingly, must have been lost.

In cases of dangerous hæmorrhage from a lung, after a wound in the side, the proper practice is to allow the lung to collapse, as now explained, that the hæmorrhage may be checked; and when the danger is past, the external wound is to be closed, that the natural play of the lung may be re-established. Life may be supported for a time by the lung in one side of the chest.

In cases of hemoptysis, or spontaneous bleeding from the lungs, a disease so often fatal, life might sometimes be saved or prolonged by making an opening between two of the ribs, and allowing the lung to collapse. The affected lung is often clearly pointed out by the circumstance; and the opening, when properly made, would be no more dangerous than in the case where, by a similar opening, water or pus is discharged from the chest.

The same operation has been tried as a forlorn hope in pulmonary consumption. This disease is often limited to the lung of one side, and as the alternate stretching and collapse of the diseased lung during respiration, together with the contact of the air powerfully prevent an ulcer from healing, or inflammation from subsiding, a new chance of recovery is given by allowing the diseased lung to collapse and remain at rest.—Some cases are recorded where cure is said to have followed this operation, and certainly, where the circumstances are favourable for it, and where death must ensue unless it can save, it is worth trying.

When ribs are fractured, it is the practice to put a bandage round the chest, so as for the time to prevent the respiratory motion of the ribs, and the breathing is then performed by the rising and falling of the diaphragm or floor of the chest, as already explained: it bulges into the chest to lessen the cavity, and is again drawn down or flattened, to increase the cavity. Although a person with broken ribs is obliged to submit to this unnatural restraint, it is surely the height of folly to inflict the same on healthy beings, as is yet, however, constantly done among young women, even to the destruction of their health, by the fashion of bracing the body in tight stays.

The force of a healthy chest's action in blowing is equal, as stated in last section, to about one pound on the inch of its surface; that is to say, the chest can condense its contained air with that force, and can therefore blow through a tube, the mouth of which is two feet under the surface of water. In sucking or drawing in air, the power is nearly the same.—In both these actions it is possible to use the cavity of the mouth separately from that of the chest; and the mouth being smaller, with stronger muscles about it in proportion to its size, it can act more strongly. Some men can suck with the mouth so as to make nearly a perfect vacuum, or to lift water nearly thirty feet: In using the blowpipe, an expert operator can keep up an uninterrupted blast by shutting the mouth behind while he inhales, and replenishing it as is required in the intervals.

## We subjoin the following extracts.

In *coughing*, the *glottis* or top of the wind-pipe, by a curious sympathy of parts, is first closed for an instant, during which the chest is compressing and condensing its contained air, and on being then opened, a slight explosion, as it were, of the compressed air takes place, and blows out

any irritating matter that may be in the air-passages, just as the burst from the chamber of an air-gun discharges its bullet.—This shutting of the glottis to allow the compression of the air, and its subsequent opening to allow the discharge, may occur at very minute intervals, and many times for one fill of the chest, as is instanced in hooping-cough. The action of cough is often produced by irritation from a cause which cannot be removed by cough, as inflammation of the chest, or tubercles; or even by irritation in a distant part, as when children are teething, or when the stomach is overloaded.

*Sneezing* is a phenomenon resembling cough, only the chest empties itself with great violence at one throe, and chiefly through the nose, instead of through the mouth, as in coughing. The irritation that produces sneezing is generally in the nose; but as in the case of cough, sneezing may occur from distant sympathies: witness that from worms in the bowels.

*Laughing* consists of quickly repeated expulsions of air from the chest, the voice being heard with them; but there is never complete closure of the entrance to the wind-pipe as in coughing.

*Crying* differs from laughing almost only in the circumstance of the intervals between the gusts of air being longer. Children laugh and cry in the same breath, and it is often difficult to mark the moment of change.

*Hiccup* is the sudden stopping of a strong inspiration at its commencement.

In *straining* to lift weights, or to make any powerful effort, the air is shut up in the lungs, that there may be steadiness and firmness of the person. At such a time, by the compression and condensation of air around the heart and large blood-vessels, the blood is determined violently outwards from the chest, and often rises to the head, with force that produces giddiness, or even apoplexy; the eye will become suddenly blood-shot, from a small vessel giving way during straining; and leech-bites will break out afresh.—the force of this pressure outwards is measured, as already stated, by a column of about two feet of blood; and this is therefore the measure of the additional arterial and venous tension in the body generally.

*Suffocation* is the name given to what happens when the supply of air to the lungs is in any way prevented. The blood, not then refreshed by the approach of the air, rises to the brain unfit for its purpose, and confusion of thought is immediately produced, soon followed by convulsion and death.

When that happens from mechanical obstruction at the narrow entrance of the wind-pipe, as in croup, by the tenacious films thrown off from the inflamed lining of the air-passages, life may be saved by making a new entrance for air through the wind-pipe lower down in the neck, and keeping it free by a little tube inserted, until the obstruction above be removed.—Where children die with croup, it is frequently not from the violence of the constitutional disease, but from detached films thus accidentally sticking in the narrow entrance of the air passage.

In the cases of strangling and hanging, the tight binding of the rope or ligature crushes inwards the cartilaginous rings of the wind-pipe, and shuts the air-passage. It may also cause apoplexy, by arresting the passage of blood to and from the head; and there may be dislocation of the cervical vertebræ of the spine.

In *drowning*, communication with the atmosphere is cut off altogether by the supernatant water, and if the chest then expands, it can

receive water only instead of air. The nerves and muscles, however, at the entrance of the wind-pipe, being exceedingly irritable, are excited by the contact of any unusual matter, and for a considerable time shut the passage against the intruding liquid. It is partly on this account that after immersion in water and apparent death, when the body is recovered within a moderate time, the life is often preserved.

**The second volume contains two parts, of which only one has as yet appeared.**

**This part is devoted to the subjects of heat and light.**

**Dr. Arnott first alludes to heat, as being that which causes the difference between summer and winter, and between the gardens of the equator, and the polar wastes.**

In the winter of climates, where the temperature is for a time below the freezing point of water, the earth with its waters is bound up in snow and ice, the trees and shrubs are leafless, appearing every where like withered skeletons, countless multitudes of living creatures, owing either to the bitter cold or deficiency of food, are perishing in the snows—nature seems dying or dead; but what a change when spring returns, that is, when heat returns! The earth is again uncovered and soft, the rivers flow, the lakes are again liquid mirrors, the warm showers come to foster vegetation, which soon covers the ground with beauty and plenty. Man, lately inactive, is recalled to many duties; his water-wheels are every where at work, his boats are again on the canals and streams, his busy fleets of industry are along the shores—winged life in new multitudes fills the sky, finny life similarly fills the waters, and every spot of earth teems with vitality and joy. Many persons regard these changes of season as if they came like the successive positions of a turning wheel, of which one necessarily brings the next; not adverting that it is the single circumstance of change of temperature, which does all. But if the colds of winter arrive too early, they unfailingly produce the wintry scene, and if warmth come before its time in spring, it expands the bud and the blossom, which a return of frost will surely destroy. A seed sown in an ice-house never awakens to life.

Again, as regards climates, the earthy matters forming the exterior of our globe, and therefore entering into the composition of soils, are not different for different latitudes,—at the equator, for instance, and near the poles. That the aspect of nature then in the two situations, exhibits a contrast more striking still than between summer and winter, is merely to an inequality of temperature, which is permanent. Were it not for this, in both situations the same vegetables might grow, and the same animals might find their befitting support. But now, in the one, namely, where heat abounds, we see the magnificent scene of tropical fertility: the earth covered with luxuriant vegetation in

endless lovely variety, and even the hard rocks festooned with green, perhaps with the vine, rich in its purple clusters. In the midst of this scene, animal existence is equally abundant, and many of the species are of surpassing beauty—the plumage of the birds is as brilliant as the gayest flowers. The warm air is perfume from the spice-beds, the sky and clouds are often dyed in tints as bright as freshest rainbow, and happy human inhabitants call the scene a paradise. Again, where heat is absent, we have the dreary spectacle of polar barrenness, namely, bare rock or mountain, instead of fertile field; water every where hardened to solidity, no rain, nor cloud, nor dew, few motions but drifting snow; vegetable life scarcely existing, and then only in sheltered places turned to the sun—and instead of the palms and other trees of India, whose single leaf is almost broad enough to cover a hut, there are bushes and trees, as the furze and fir, having what may be called hairs or bristles, in the room of leaves. In the winter time, during which the sun is not seen for nearly six months, new horrors are added, *viz.* the darkness and dreadful silence, the cold benumbing all life, and even freezing mercury—a scene into which man may penetrate from happier climes, but where he can only leave his protecting ship and fires for short periods, as he might issue from a diving-bell at the bottom of the ocean. That in these now desolate regions, heat only is wanted to make them like the most favored countries of the earth, is proved by the recent discoveries under ground of the remnant of animals and vegetables formerly inhabiting them, which now can live only near the equator. While winter then, or the temporary absence of heat, may be called the sleep of nature, the more permanent torpor about the poles appears like its death; and when we farther reflect, that heat is the great agent in numberless important processes of chemistry and domestic economy, and is the actuating principle of the mighty steam engine which now performs half the work of society, how truly may heat, the subject of our present chapter, be considered as the life or soul of the universe!

**The remarks of our author on the *conducting properties* of various bodies, are possessed of interest, particularly, those which relate to clothing.**

Animals required to be protected against the chills of night, and the biting blasts of winter; and some of them which dwell among eternal ice, could not have lived at all, but for a garment which might shut up within it nearly all the heat which their vital functions produced. Now any covering of a metallic, or earthy, or woody nature, would have been far from sufficing; but out of a wondrous chemical union of carbon with the soft ingredients of the atmosphere, those beautiful textures are produced, called fur and feather, so greatly adorning while they completely protect the wearers—textures moreover, which grow from the bodies of the animals, in the exact quantity that suits the climate and season, and which are reproduced when by any accident they

are partially destroyed. In warm climates the hairy coat of quadrupeds is comparatively short and thin; as in the elephant, the monkey, the tropical sheep, &c. It is seen to thicken with increasing latitude, furnishing the soft and abundant fleeces of the temperate zones; and towards the poles it is externally shaggy and coarse, as in the arctic bear. In amphibious animals, which have to resist the cold of water as well as of air, the fur grows particularly defensive, as in the otter and beaver. Birds, from having very warm blood, required plenteous clothing, but required also to have a smooth surface, that they might pass easily through the air:—both objects are secured by the beautiful structure of feathers, so beautiful and wonderful, that writers on natural theology have often particularized it as one of the most striking exemplifications of creative wisdom. Feathers, like fur, appear in kind and quantity suited to particular climates and seasons.—The birds of cold regions have covering almost as bulky as their bodies, and if it be warm in those of them which live only in air, in the water-fowl it is warmer still. These last have the interstices of the ordinary plumage filled up by the still more delicate structure called down, particularly on the breast, which in swimming first meets and divides the cold wave. There are animals with warm blood which yet live very constantly immersed in water, as the whale, seal, walrus, &c. Now neither hair nor feathers, however oiled, would have been a fit covering for them; but kind nature has prepared an equal protection in the vast mass of fat or thick oil, which surrounds their bodies—substances which are scarcely less useful to man than the furs and feathers of land animals.

While speaking of clothing, we may remark, that the bark of trees is also a structure very slowly permeable to heat, and securing therefore the temperature necessary to vegetable life.

And while we admire what nature has thus done for animals and vegetables, let us not overlook her scarcely less remarkable provision of ice and snow, as winter clothing for the lakes and rivers, for our fields and gardens. Ice, as a protection to water and its inhabitants, was considered in vol. i. in the explanation of why, although solid, it swims on water. We have now to remark that snow, which becomes as a pure white fleece to the earth, is a structure which resists the passage of heat nearly as much as feathers. It, of course, can defend only from colds below 32 degrees or the freezing point; but it does so most effectually, preserving the roots and seeds, and tender plants during the severity of winter. When the green blade of wheat and the beautiful snow-drop flower appear in spring rising through the melting snow, they have recently owed an important shelter to their wintry mantle. Under deep snow, while the thermometer in the air may be far below zero, the temperature of the gronnd rarely remains below the freezing point. Now this temperature, to persons some time accustomed to it, is mild and even agreeable. It is much higher than what often prevails for long periods in the atmosphere of the centre and north of Europe. The Laplander, who during his long winter lives under ground, is glad to have additionally over head a thick cov-

ering of snow. Among the hills of the west and north of Britain, during the storms of winter, a house or covering of snow frequently preserves the lives of travellers, and even of whole flocks of sheep, when the keen north wind catching them unprotected, would soon stretch them lifeless along the earth.

Again,

It is the difference of conducting power in bodies which is the cause of a very common error made by persons in estimating the temperature of bodies by the touch. In a room without a fire all the articles of furniture soon acquire the same temperature; but if in winter, a person with bare feet were to step from the carpet to the wooden floor, from this to the hearth stone, and from the stone to the steel fender, his sensation would deem each of these in succession colder than the preceding. Now the truth being that all had the same temperature, only a temperature inferior to that of the living body, the best conductor, when in contact with the body, would carry off heat the fastest, and would therefore be deemed the coldest. Were a similar experiment made in a hot house, or in India, while the temperature of every thing around were 98 deg., *viz.* that of the living body, then not the slightest difference would be felt in any of the substances: or lastly, were the experiment made in a room where by any means the general temperature were raised considerably above blood-heat, then the carpet would be deemed considerably the coolest instead of the warmest, and the other things would appear hotter in the same order in which they appeared colder in the winter room. Were a bunch of wool and a piece of iron exposed to the severest cold of Siberia, or of an artificial frigorific mixture, a man might touch the first with impunity (it would merely be felt as rather cold;) but if he grasped the second, his hand would be frost-bitten and possibly destroyed: were the two substances on the contrary, transferred to an oven, and heated as far as the wool would bear, he might again touch the wool with impunity: it would then be felt as a little hot, but the iron would burn his flesh. The author has entered a room where there was no fire, but where the temperature from hot air admitted was sufficiently high to boil the fish, &c., of which he afterwards partook at dinner; and he breathed the air with very little uneasiness. He could bear to touch woollen cloth in this room, but no body more solid.

The foregoing considerations make manifest the error of supposing that there is a positive warmth in the materials of clothing. The thick cloak which guards a Spaniard against the cold of winter is also in summer used by him as protection against the direct rays of the sun: and while in England flannel is our warmest article of dress, yet we cannot more effectually preserve ice than by wrapping the vessel containing it in many folds of softest flannel.

In every case where a substance of different temperature from the living body touches it, a thin surface of the substance immediately shares the heat of the bodily part touched—the hand generally; and while in a

good conductor, the heat so received quickly passes inwards or away from the surface, leaving this in a state to absorb more, in the tardy conductor the heat first received tarries at the surface, which consequently soon acquires nearly the same temperature as the hand, and therefore, however cold the interior of the substance may be, it does not cause the sensation of cold. The hand on a good conductor has to warm it deeply, a slow conductor it warms only superficially. The following cases farther illustrate the same principle. If the ends of an iron poker, and of a piece of wood of the same size, be wrapped in paper, and then thrust into a fire, the paper on the wood will begin to burn immediately, while that on the metal will long resist:—or if pieces of paper be laid on a wooden plank and on a plate of steel, and then a burning coal be placed on each, the paper on the wood will begin to burn long before that on the plate. The explanation is, that the paper in contact with the good conductor loses to this so rapidly the heat received from the coal, that it remains at too low a temperature to inflame, and will even cool to blackness the touching part of the coal; while on the tardy conductor the paper becomes almost immediately as hot as the coal. It is because water exposed to the air cannot be heated beyond 212 deg. that it may be made to boil in an egg-shell or a vessel made of paper, held over a lamp, without the containing substance being destroyed; but as soon as it is dried up, the paper will burn and the shell will be calcined, as the solder of a common tinned kettle melts under the same circumstances. The reason why the hand judges a cold liquid to be so much colder than a solid of the same temperature is, that from the mobility of the liquid particles among themselves, those in contact with the hand are constantly changing. The impression produced on the hand by very cold mercury is almost insufferable, because mercury is both a ready conductor and a liquid. Again, if a finger held motionless in water feel cold, it will feel colder still when moved about; and a man in the air of a calm frosty morning does not experience a sensation nearly so sharp as if with the same temperature there be wind. A finger held up in the wind discovers the direction in which the wind blows by the greater cold felt on one side, the effect being still more remarkable, if the finger is wetted.—If a person in a room with a thermometer, were with a fan or bellows to blow the air against it, he would not thereby lower it, because it had already the same temperature as the air, yet the air blown against his own body would appear colder than when at rest, because, being colder than his body, the motion would supply heat-absorbing particles more quickly. In like manner, if a fan or bellows were used against a thermometer hanging in a furnace or hot house, the thermometer would suffer no change, but the air moved by them against a person would be distressingly hot, like the blasting sirocco of the sandy deserts of Africa. If two similar pieces of ice be placed in a room somewhat warmer than ice, one of them may be made to melt much sooner than the other, by blowing on it with a bellows. The reason may here be readily comprehended why a person suffering what is called a cold in the head, or catarrh from the eyes and nose, experiences so much

more relief on applying to the face a handkerchief of linen or cambric than one of cotton:—it is, that the former by *conducting* readily absorbs the heat and diminishes the inflammation, while the latter, by refusing to give passage to the heat, increases the temperature and the distress. Popular prejudice has held that there was a poison in cotton.

Perhaps we might remark in two or three places, a tendency to repetition in the author, evidently shewing marks of haste and inattention. At page 34, he tells us "a black stone," &c., and then in page 38, "as a black earthen," &c.

The effect of caloric in regulating the climate in elevated regions, is prettily expressed.

We have just said, that even at the equator, where the average temperature near the sea is 84 deg., water will be frozen when carried to an elevation of 15,000 feet. A line, therefore, traced on a mountain at this level, would divide the portion of it destined to sleep under lasting ice and snow from the portion below covered with green herbage. This line, wherever found, is called the *snow line*, or *line of perpetual congelation*. At the equator it is high in the atmosphere, because there is a difference of about 50 deg. between the average temperature of the country and the freezing point of water, viz. the difference between 84 deg. and 32 deg., and an elevation of 15,000 feet corresponds to this difference; but in a progress towards the poles, the line is met with gradually nearer the earth, as the difference in question is less. In Switzerland it is at 6,500 feet above the sea; in Norway, it is below 5,000. With respect to the line of congelation, it is farther to be remarked, that in tropical countries, because the temperature of the air is nearly uniform during the whole year, the line or limit of frost and snow is distinct and unvarying, that is to say, is narrow, particularly where the acclivity is considerable; but, in countries to the north and south, which experience strong contrast of summer and winter, the line becomes broad and less evident; because, in the hot season much snow is melted, or half melted, above what may be called an average line, while in winter much snow and ice are accumulated below this, to be melted again when summer returns.

In the breadth of the line of congelation for changeable climates, we have the reason of the formation of what are called glaciers, around snow-capped mountains situated in such climates, and around such only. The snow near the upper part of the broad line having been only softened or half-thawed in the preceding summer, becomes in winter, almost as solid as ice, and in the succeeding summer vast masses of this, detached by the action of the sun, and of the central heat of the earth, spreading outwards, and loaded with more recent accumulation of snow, are constantly falling down into the valleys beneath, where, being accumulated, and the crevices filled up with snow or with wa-

ter, which hardens to ice, they form at last the huge glaciers, or seas of ice—*mers de glace*, which render certain regions so remarkable.—The falling of such masses (called in Switzerland *avalanches*,) is what renders the ascent to snow-clad mountains terrific and dangerous.—Around Mont Blanc, in the awful solitudes of the elevated valleys, the avalanches are thundering down almost without interruption during the whole summer—in which season only the attempt to ascend the mountain can be made, and a pistol-shot, or any considerable agitation of the air, may suffice to set loose masses that will sweep away a whole convoy. Beneath glaciers there is always going on a melting of that part of the ice which is in contact with the earth, and hence a stream of water constantly issues from the bed of every glacier. These streams, in Switzerland, are the beginnings of the magnificent rivers, the Rhine and the Rhone. Like the avalanches breaking loose in summer among the mountains, there are in the polar seas vast masses of ice detached from the shores, and which afterwards move into warmer seas to be melted. These often become, to the arctic bear, rafts, on which, to his surprise, he finds himself voyaging into new latitudes, to be left at last adrift in the wide ocean when his ship has vanished from beneath him.

Although the proofs are not so immediately apparent, the line of congelation exists as truly every where in the open sky, over sea and plains, as where there are mountain heights to wear its livery; and considerably below the line, the cold, aided by electrical agency, is sufficient to produce, in the form of mist or clouds, a deposition from the air of the watery vapour contained in it. There is thus in nature an admirable provision to shade the earth at proper times from the too powerful rays of the sun, or to supply rain as wanted, without the transparency of the inferior regions of the atmosphere being much affected. As the watery vapour, rising from sea or lake, and invisibly diffused in the atmosphere, can only reach to the height where the cold is great enough to condense it, the clouds may in general be regarded as the top of that atmosphere of watery vapour, or aeriform water, which is always mixed more or less with the atmosphere of mere air; and as the quantity of watery vapour which can exist invisibly in a given space, depends altogether on the intensity of heat present, the clouds in a humid atmosphere will be low, and in a dry atmosphere will be high, or there may be none. An aeronaut mounting in his balloon through a clear sky, often approaches a dense cloudy stratum to plunge into it, and for a time be surrounded with gloom almost of night; the face of earth being hidden from him below, while the heavenly bodies are equally veiled from him above; but rising still higher, he again emerges to brightness, and looks down upon the fleecy ocean rolled in mountain heaps beneath him, as the climber to a lofty peak may look down from the ever pure atmosphere around it on the inferior region of clouds and storms.

The diminished temperature of air in the higher regions of the atmosphere, often enables the natives of temperate climates, when led by circumstances to reside in tropical countries, where their health

may suffer from the heat, to find near at hand, on some mountain height, the congenial temperature of their early homes. The author once, during a visit to the recently inhabited island of Penang, in the strait of Malacca, examined this fact with pleasure not readily forgotten. The centre of the island is occupied by a lofty mountain ridge thickly wooded, on the northern summit of which a few residences, visible from the sea-shore like eagles' nests on a cliff, had just been constructed. Towards these, one morning at sun-rise, on an active little horse of the country, and along a tolerable road, he began to climb from the hot plain below. At first there were around him purely tropical objects, inspiring tropical feelings,—the latter, modified indeed, by the reflection that his track lay through a forest, into which until lately the foot of man had never ventured, and where the trees, nursed through ages to their greatest growth, and the stupendous precipices, and the sublime water-fall, &c., had so recently been exposed to human observation; but, as he gradually ascended, the character of the vegetation was perceived to be changing, and the air was becoming so light and cool as irresistibly to awaken in him thoughts of distant England—nay, almost the illusion of his being there. At last, however, the summit being reached, where a clear space opened to view the whole country around, the attention was quickly recalled to the fervid land of the sun. The elevation is so great that at first the eye takes account of only the grander features of the scene, and such nearly as might be met with on a Grecian or Italian shore:—the expanse of sunny water in that beautiful strait, stretching so far north and south, the opposite continental shore with its river winding seaward across the plain, the town and the roadstead near it crowded with ships, which appeared only as specks in a wide-spread map, &c.; but on closer inspection, and particularly with the aid of the telescope, were descried the rich groves of cocoa nut and banana, the plantations of spice, and cotton, and sugar cane, the tawny laborers, the bamboo dwellings, the fanciful canoes or prows, in a word, every object bespeaking the torrid zone. Such then is the scene, which even under the equator, an invalid by climbing a hill may place under his eye, and where the thermometer near him stands as in an English month of May.

**We pass over the capacity of bodies for caloric, and the general principles of latent heat, and the effects of caloric on chemical changes, whether producing them, or produced by them, to its influence on inanimate nature, whether vegetable or animal.**

The influence which heat exerts on inanimate nature, is more immediately and completely perceived by the common mind, than its influence on beings which have life. Thus to all it is obvious, that the contrast between a winter and summer landscape, is owing chiefly to the effect of heat on the water of the landscape;—that during its ab-

sence in winter, there is the dry barren deformity of accumulated ice and snow, covering every thing, the roads impassable, the rivers bound up, perhaps hidden, the air deprived of moisture, and loaded often with powdery drift; and that when warmth comes, the living streams again appear, gliding their way, the cascades pour, the rills murmur, the canals once more offer their bosoms to the boats of commerce, the lake and pool again show their level face, reflecting the glories of the heavens, and the genial shower falls upon the bosom of the softened earth, become ready to receive the spade or the ploughshare. Now this change is not at all greater than what happens to a winter tree acted upon by the warmth of spring. To take another instance from inanimate nature, it may be said with truth, that heat applied to the cold boiler of a steam-engine, is the cause of all its succeeding motions; of the heaving of its beam and pumps, the opening and shutting of its valves, the turning of its wheels and its ultimate performance of work, as of spinning, or weaving, or grinding, or propelling vehicles by land and water; but as truly may it be said, that heat coming to a seed, which has lain cold for ages, is the cause of its immediate germination and growth, or coming to a lately frozen tree, is the cause of the rising of its sap, the new budding and unfolding of its leaves and blossoms, the ripening of its fruit. And what is true of one seed or tree, is true of the whole of the vegetable creation. When the warm gales of spring have once breathed on the earth, it soon becomes covered, in field and in forest, with its thick garb of green, and soon opening flowers or blossoms every where breathe back again a fragrance to heaven.—Among these the heliotrope is seen always turning its beautiful disk to the sun, and many delicate flowers only open their leaves to catch the direct solar ray, but close them often even when a cloud intervenes, and certainly when the chills of night approach. On the sunny side of a hill, or in the sheltered crevice of a rock, or on a garden wall with warm exposure, there may be produced grapes, peaches, and other delicious fruits, which will not grow in situations of an opposite character—all acknowledging heat as the immediate cause, or indispensable condition of vegetable life.

But among animals too, the effects of heat are equally remarkable. The dread silence of winter, for instance, is succeeded in spring by one general cry of joy. Aloft in the air the lark is every where carolling; and in the woods and shrubberies, a thousand little throats are similarly pouring forth their songs of gladness—during the day, the thrush and blackbird near our dwellings, are heard above the rest, and with the evening comes the sweet nightingale—for all of which it is the season of love and of exquisite enjoyment. And it is equally so for animal nature generally: in favored England, for instance, in April and May the whole face of the country resounds with lowings and bleatings and barkings of joy. And even man, the master of the whole, and whose mind embraces all times and place, is far from being insensible to this change of season. His far-seeing reason, of course, draws delight from the anticipation of autumn, with its fruits; and his benevolence rejoices in the happiness observed among all inferior

creatures; but independently of these considerations, on his own frame the returning warmth exerts a direct influence. In early life, when the natural sensibilities are yet fresh and unaltered by the habits of artificial society, spring to man is always a season of delight. The eyes brighten, the whole countenance is animated, and the heart feels as if new life were come, and has longings for fresh objects of endearment.—Of those who have passed their early years in the country, or among the charms of nature, as contrasted with the arts of cities, there are few who, in their morning walks in spring, have not experienced without very definite cause, a kind of tumultuous joy, of which the natural expression would have been, how good the God of nature is to us! Spring is a time when sleeping sensibility is roused to feel that there lies in nature more than the grosser sense perceives. The heart is then thrilled with sudden extacy, and wakes to aspiration of sweet acknowledgment.

## The functions of animal life are a source of heat.

It is one of the remarkable facts in nature, that living animal bodies, and to a certain degree, living vegetables also, have the property of maintaining in themselves a peculiar temperature, whether surrounded by bodies that are hotter or colder than they. Captain Parry's sailors, during the polar winter, where they were breathing air that could freeze mercury, still had the natural warmth in them of 98 deg. Fahrenheit; and the inhabitants of India, where the same thermometer stands sometimes at 115 deg. in the shade, have their blood at no higher a temperature.

It was at one time the favorite explanation of this, that animal heat was produced in the lungs, during respiration, from the oxygen then admitted. This oxygen combines with carbon from the blood, and becomes carbonic acid as in combustion, and it was supposed to give out a portion of its latent heat, as in actual combustion; which heat being then spread over the body by the circulating blood, maintained the temperature.—We now know, that if such a process assist, which it probably does,—for the animal heat has generally a relation to the quantity of oxygen expended in any particular case, and when an animal being already much heated needs no increase, very little oxygen disappears,—still much of the effect is dependent on the influence of the nerves, either directly or indirectly, through the vital functions governed by them. Mr. Brodie, in his important experiments upon the subject, found that although in animals apparently dead from injury done to the nervous system, he could artificially continue the action of respiration, with the usual formation of carbonic acid, still the temperature fell very quickly. The maintenance of low temperature in an animal immersed in air hotter than itself, is partly attributable to the copious perspiration and evaporation which then take place, and which absorb into the latent form the excess of heat then existing. Perspiration, both from the skin and internal surface of the lungs, occurs generally in proportion to the excess of heat. Dogs and other animals, when much heated, as they cannot throw off or diminish their natural covering, increase the evaporating surface by protruding a long humid tongue.

The power in animals of preserving their peculiar temperature has its limits. Intense cold coming suddenly upon a man who has not sufficient protection, first causes a sensation of pain, and then brings on an almost irresistible sleepiness, which if indulged would be fatal. Sir Joseph Banks having gone on shore one day near the cold Cape Horn, and being fatigued, was so overcome by the feeling mentioned, that he en-

treated his companions to let him sleep for a little while. His prayer granted, might have allowed that sleep to come upon him which ends not—the sleep of death! as, under similar circumstances, it came upon so many thousands of the army which Bonaparte led into Russia, and lost there during the disastrous retreat through the snows. Bonaparte's celebrated bulletin allowed, that in one night, when the thermometer of Reaumur stood at 19 deg. below zero, 30,000 horses died! Cold in inferior degrees, and longer continued, acting on persons imperfectly protected by clothing, &c., induces a variety of diseases, which destroy more slowly. A great excess of heat, again, may at once excite a fatal apoplexy, and heat in inferior degrees, but long continued, may cause those fevers, &c., which prevail in warm climates, and which are so destructive to strangers in these climates.

Each species of animal has a peculiar temperature natural to it, and in the diversity are found creatures fitted to live in all parts of the earth, what is wanting in internal bodily constitution, being found in the admirable protecting covering which nature has provided for them—covering which grows from their bodies, with form of fur or feather, in the exact degree required, and even so as in the same animal to vary with climate and season. Such covering, however, has been denied to man; but the denial is not one of unkindness:—it is the indication of his superior nature and destinies. Godlike reason was bestowed on man, by which he subjects all nature to his use, and he was left to clothe himself.

The human race is naturally the inhabitant of a warm climate, and the paradise described as Adam's first abode, may be said still to exist over vast regions about the equator. There the sun's influence is strong and uniform, producing a rich and warm garden, in which human beings however ignorant of the world which they had come to inhabit, would have their necessities supplied almost by wishing. The ripe fruit is there always hanging from the branches; of clothing there is required only what moral feelings may dictate, or what may be supposed to add grace to the form; and as shelter from the weather, a few broad leaves spread on connected reeds will complete an Indian hut. The human family, in multiplying and spreading in all directions from such a centre, would find to the east and west, only the lengthened paradise, with slightly varying features of beauty; but to the north and south, the changes of season, which make the bee of high latitudes lay up its winter store of honey, and send migrating birds from country to country in search of warmth and food, would also rouse man's energies to protect himself. His faculties of foresight and contrivance would come into play, awakening industry; and, as their fruits, he would soon possess the knowledge and the arts which secure a happy existence in all climates, from the equator almost to the pole. It is chiefly because man has learned to produce at will, and to control the wonder-working principle of heat, that in the rude winter, which seems the death of nature, he, and other tropical animals and plants which he protects, do not in reality perish—even as a canary bird escaped from its cage, or an infant exposed among the snow-hills. By producing heat from his fire, he obtains a novel and most pleasurable sort of existence; and in the night, while the dark and freezing winds are howling over his roof, he basks in the presence of his mimic sun, surrounded by his friends and all the delights of society, while in his store-rooms, or in those of merchants, at his command, he has the treasured delicacies of every season and clime. He soon becomes aware, too, that the dreary winter, instead of being a curse, is really in many respects a blessing, by arousing him from the apathy to which the eternal serenity of a tropical sky so much

disposes. In climates where labour and ingenuity must precede enjoyment, every faculty of mind and body is invigorated; and hence the sterner climates form the perfect man. It is in them that the arts and sciences have reached their present advancement, and that the brightest examples have appeared of intellectual and moral excellence.

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ART. VII. *Lectures on Physiology, Zoology, and the Natural History of Man*, delivered at the Royal College of Surgeons—By W. LAWRENCE, F. R. S., Professor of Anatomy and Surgery to the College, Assistant Surgeon to St. Bartholomew's Hospital, Surgeon to Bridewell and Bethlem Hospitals, and to the London Infirmary for Diseases of the Eye.

The science of Natural History appears to be the peculiar province of the medical profession. Every department of it has been investigated by physicians with peculiar industry and zeal; and if they have not laid the foundations of the edifice, they have completed the structure, and determined its symmetry, order and arrangement. Every subject in any way connected with the profession of medicine they have studied with unremitting ardor, making it their pride, like the ancient Suevi, to conquer every territory bounding on their domain, not, however, that barren deserts may bear testimony to their valor, but that cultivated regions, appropriated to the general interests of mankind, may evince their civilization and humanity.

Of the different provinces of Natural History, none is connected with the science of medicine by more interesting and important relations than zoology. The pharmaceutist has been led to prosecute the study from the number of valuable remedial agents drawn from the animal kingdom. The physiologist and anatomist have pursued the science with more ardor and additional interest, from the light which a knowledge of the structure and physiology of the animal kingdom is calculated to throw upon their own favorite pursuits. A third class, forgetting the primary object of their pursuit, have pursued the collateral

science as a principal, and degrading man from his high superiority, have considered him only as a subdivision of one of the classes of animals which inhabit our globe.

To rescue man from this degraded rank in the animal creation, and to assign him a station more agreeable to his vanity, and more consistent with his general pretensions, is, in part, the design of the work before us.

It is not a little curious, however, to observe, that while Dr. L. manifests a very becoming zeal for the nobility of the human family, he, like most persons who affect a great deal of neutrality, manifests a spirit of bitter hostility towards those who, more orthodox than himself, take the liberty of denouncing the investigation of tenets which they consider necessary to the perfection of their system.

Dr. L. contends for the common origin of the human family, and their superiority to the animal creation; but he indulges the bitterest sarcasm towards those who think they are distinguished from the rest of the animal creation by an immaterial spirit. That the author has seen proper to treat the illiberality of his opponent in this manner, we think is very much to be regretted. The fact is now universally admitted, not only that ridicule is a most imperfect test of truth, but that sarcasm is, of all other arguments, the least calculated to convince an opponent. The question is in our opinion entirely beyond the reach of human reason, and the dogmatism of the disputants tends to confirm us in this opinion. Nor ought the decision of this question to have any bearing upon our opinions respecting the immortality of the soul. The belief in this latter doctrine is found so universally to prevail among mankind, of every age and nation, and through every rank and condition of society, that we cannot avoid considering it as one of the principles of the human mind, either immediately implanted by the creator, or made to arise so inevitably from the circumstances in which man is placed in society, as to be considered the work of the author of our existence; and it is this divine sanction to the belief that forms the strongest argument which human reason can offer in its behalf.

But whatever influence the doctrine of materialism ought legitimately to have over our moral sentiments, we are confident that its actual influence has been very injurious. While we admit therefore, that the friend of Truth should boldly follow wherever she leads him, it is by no means to be inferred that every ingenious speculator who disturbs the order of society by opinions which derive their plausibility from the weakness and ignorance of the human mind, should justify his rashness, under the specious show of a disinterested love of truth. With these remarks, we shall proceed to that part of the work in which we are now immediately interested.

This part of the work Mr. L. has divided into two sections—the first, *treating on the difference (corporeal and mental) between man and other animals*—or, in other words, *on the specific character of man:* the second will contain *an enumeration and discussion of the characters by which the different races of mankind are distinguished from each other, and a full consideration of the question whether they ought to be regarded as originally distinct species, or as varieties of a single species.*

Linneus in placing man in the order *primates*, of the class MAMMALIA, in company with the monkeys and bats, has remarked, that he can establish no characteristic by which man can be distinguished from the monkey. Mr. L. very well remarks, that if this were true, Zoology would not deserve the rank of a science.

Man is placed in a separate order with the following zoological distinctions.

Order bimanum (two handed); genus homo; *characters*: erect stature; two hands; teeth approximated and of equal length; the inferior incisors perpendicular; prominent chin; rational; endowed with speech; unarmed; defenceless.

The following summary, introduced by the author as a recapitulation of the charcters of man, will afford a comprehensive view of the proofs of his constituting a separate and distinct species.

1. Smoothness of the skin, and want of natural offensive weapons, or means of defence.

2. Erect stature; to which the conformation of the body in general, and that of the pelvis, lower limbs, and their muscles in particular are accommodated.
3. Incurvation of the Sacrum and os coccygis; and consequent direction of the vagina and urethra forwards.
4. Articulation of the head with the spinal column by the middle of its basis, and want of ligamentum nuchæ.
5. Possession of two hands, and very perfect structure of the hand.
6. Great proportion of the cranium (cerebral cavity) to the face (receptacles of the senses and organs of mastication.)
7. Shortness of the lower jaw, and prominence of its mental portion.
8. Want of the intermaxillary bone.
9. Teeth all of equal length, and approximated: inferior incisors perpendicular.
10. Great developement of the cerebral hemispheres.
11. Great mass of brain, in proportion to the size of the nerves connected with it.
12. Greater number and development of mental faculties, whether intellectual or moral.
13. Speech.
14. Capability of inhabiting all climates and situations; and of living on all kinds of food.
15. Slow growth; long infancy; late puberty.
16. Menstruation; exercise of the sexual functions not confined to particular seasons.

The erect attitude and biped progression are characteristic of man, and adapted to these we have the conformation of the lower limbs; the form and position of the pelvis; the arrangement of the spine; the junction of the head with the vertebral column; the direction of the face and eyes; and the superior extremities formed for prehension and not for the support of the body.

The lower limbs in man are characterized by their length and strength; by the strength of their muscles, and especially of the glutei and gastrocnemii muscles, which have been noticed by the earliest naturalists, as peculiar to man; by their axes coinciding with the centre of gravity of the body; and by the freedom and extent of their motions upon the pelvis.

The peculiarities of the feet are not less distinctly marked, designating them as the sole ultimate support of the body. The whole surface of the tarsus, metatarsus, and toes, and the great protuberance of the os calcis resting on the ground, give them a degree of firmness, solidity and strength, in proportion to the size of the body, that is not possessed by any other animal;

and this latter bone forming a right angle with the leg, gives to the powerful muscles which are inserted into it, peculiar facility for supporting the erect attitude.

In all these particulars we observe a striking contrast between man and those animals which most nearly resemble him. Even in the monkey tribes the cervix femoris is short, and in other animals it is entirely wanting, so that the lateral motion of the legs is very much restricted; the thigh bone forms an angle with the spine, and generally an acute one; it is short, straight and nearly concealed by the muscles which cover it; and the leg forms an angle with the thigh, and is kept habitually bent by the muscles inserted into it; the os calcis is raised so as to form an angle with the leg, so that the digitated quadrupeds support themselves on the toes, while in others, this bone is raised perpendicularly, and the extremity of the phalanges rests upon the ground.

The peculiarities of the pelvis do not afford less decisive evidence that the erect position is natural to man.

The peculiarities of the human pelvis coincide with those of the lower limbs. The form of this part is very characteristic in man, and distinguishes him from the simiæ, and indeed from all other mammalia. It might be asserted, that the human skeleton alone has a proper pelvis; that is, such an incurvation of the sacrum and coccyx, and such an union of them with the ossa innominata, as forms a basin-like cavity, from which, the space included between the elongated ilia, and the straight sacrum and coccyx of monkeys, differs toto cœlo. In the orang-outang, and the elephant, we find the nearest approach to the human formation. In the former, however, the upper part of the ilium is narrow and elongated, stretching upwards in the direction of the spine, and its length exceeds its breadth, so that the relations of these two dimensions are very different in man and this animal. In the latter, the symphysis pubis is very deep; and in both, there is neither that incurvation of the sacrum, from the promontory downwards, nor that direction of the coccyx forwards, which, with the broad horizontal expansion of the ilia, and the shallowness of the symphysis pubis, are peculiar to the human frame, and make it a broad and firm basis for the trunk, on which the weight of the abdominal contents, and particularly of the pregnant uterus, is supported. The lower part of the sacrum and the os coccygis are turned forwards in man, and form the only firm bony resistance, in the inferior aperture of the pelvis, to the abdominal viscera, forced downwards by the diaphragm and abdominal muscles. These bones are straight in all other animals, because the weight of the viscera is differently supported. Even in the orang-outang, the sacrum is flat and contracted, and continued, together with the os coccygis, in a straight line with the vertebral column. If the human sacrum and coccyx had been contin-

ued in a straight line with the spine, as those of the orang-outang and monkeys are, the ossa innominata remaining as at present, they would have projected beyond those bones, so as to disable us from sitting. The curve which they describe, in man only, obviates this inconvenience; and allows the pelvis to rest securely, in the sitting attitude, on the broad and strong ischiatic tuberosities.

The distribution, size, and offices of the muscles, are also peculiarly appropriate to the erect position. The large glutei muscles forming the buttocks, the exterior of which the largest in the body, preserves the body in the erect position, and the two others supporting the body upon one leg while the other is elevated—are peculiar to man. The extensors of the leg are very powerful in man, to serve the two-fold purpose of supporting the weight of the body, and of carrying the leg forward on the thigh in progression. In animals, on the contrary, the flexors predominate.

The muscles of the ankle joint, and especially those which form the calf, sustain the weight of the body, and are the chief instruments in progression, and from the great weights imposed upon them, are necessarily very powerful, the protuberance therefore, which they form upon the back part of the leg is peculiar to man, and may be considered as a requisite of the erect position.

The whole arrangement of the thorax corresponds to the erect attitude of man, its lateral diameter is very considerable, thereby placing the arms farther apart, and giving greater extent to their motions; it is pyramidical in its shape, thereby lowering the centre of gravity of the body; and since the weight of the abdominal viscera is sustained by the pelvis, its length is contracted by shortening the sternum and reducing the number of the ribs.

In animals, on the other hand, it is compressed laterally but deep, from the sternum to the spine, that the fore legs may be brought nearly together, for more conveniently sustaining the body. Their sternum is long and narrow, and together with the ribs, approaches more nearly to the pelvis, for better supporting the abdominal viscera.

For some peculiarities in the spine and the pelvis, we shall refer to the author.

The spine of man presents some important peculiarities resulting from his characteristic attitude. One of these is, its very remarkable increase of size in the lumbar region; an augmentation corresponding to that of the superincumbent weight, and to the magnitude of the efforts which this part has to sustain. The immense bulk of the sacrum, far exceeding in proportion to the rest of the body, that of any animal, is referable to the same cause, to the mode in which this weight is transmitted to the hip-bones, and thence to the lower limbs, to the peculiar construction of the pelvis. The waving line of the column, arising from a series of curves in opposite directions, is altogether peculiar to man; it allows a proper distribution of the weight with respect to the centre of gravity, the line of which, carried through the entire trunk, must fall within the space covered by the feet, or by one foot, when we support the body on one only. As this line passes through all the curves, motion is allowed in the upper regions without impairing the general equilibrium.

I have explained how the lower extremities afford a sufficient base of support and solid columns to sustain the trunk, and how the same point is secured by the organic arrangement of the latter. The breadth of the human pelvis forms an ample basis for the body, and a firm point of action for the abdominal and other muscles, enabling them quickly to rectify the position of the parts above. In all the digitated animals the pelvis is so narrow that the trunk resembles an inverted pyramid: there would be great difficulty in maintaining it in equilibrio, even were it possible for the animal to assume the erect position. In those instances where the pelvis is broader, as in the hoofed animals, the other conditions of the upright stature are absent. The bear, however, forms an exception to these observations, and may be taught to stand and walk erect, although the posture is manifestly irksome to the animal. When quadrupeds endeavor to support themselves on the hind extremities, as for the purpose of seizing any object with the fore feet, they rather sit down than assume the erect position; for they rest on the thighs, as well as on the feet; and this can only be done where the fore part of the body is small, as in the simiæ, squirrel, &c. In other cases the animal is obliged to support itself by the fore feet also, as in the dog, cat, &c.

It has been already remarked that man is a *two handed* animal, and his hands are so admirably and peculiarly constructed for the purpose of prehension, that the name has been appropriated to his members.

There is a general resemblance of form throughout the upper and lower extremities, in their principal divisions, the number and form of their bones, the structure of their articulations, and in the muscles which are attached to them. This coincidence is so great that the contrast between them cannot fail to impress upon the most casual observer, the different offices

which are appropriated to each. Solidity is the characteristic of the latter, and mobility of the former, and such is the modification in the structure and component parts of each, to secure these objects, that the ultimate design is immediately manifest. The lower extremities possess only so much mobility as will enable them to accommodate themselves to the changing positions of the body, and to resist the shock to which it is necessarily exposed by these changes. In the upper extremities every thing is sacrificed to freedom of motion, and owe much of their security to that flexibility of structure that enables them to elude the violence which their more delicate organization could not resist.

In no part is this contrast more striking than in the hands and feet. The meta-carpus and fingers form the principal part of the hand, in which every joint possesses a freedom of articulation that fits it for the nicest manifestations, while the thumb is placed as an opposable member, with a peculiar set of muscles to second its operations.

In the foot on the other hand, the large bones of the tarsus, united by strong articulations, admitting of little motion, form the principal part, and sustain the weight of the body when at rest in the erect position. The metatarsal bone of the great toe, united to the tarsus by a firm articulation, with just sufficient flexibility to impart the elasticity which its situation and office require, is placed parallel with the rest, is moved by the same, or a corresponding set of muscles, and, with them, sustains the body when raised upon the toes, and in walking, leaping, &c.

In comparing this part of the human structure with that of other animals, Mr. L. has the following remarks.

The human hands being terminated by long and flexible members, of which only a small portion is covered by the flat nails, while the rest is furnished with a highly organized and very sensible integument, form admirable organs of touch and instruments of prehension. The animal kingdom exhibits no corresponding part so advantageously constructed in these respects. At the same time, the lateral attachment of the arms to the trunk, and the erect attitude, give us the freest use of these admirable instruments.

Several mammalia have also hands, but much less complete, and less

serviceable than that of the human subject, which, in comparison to them, was justly enough termed by the Stagyrite, the organ of all organs. The great superiority of the human hand arises from the size and strength of the thumb, which can be brought into a state of opposition to the fingers, and is hence of the greatest use, in enabling us to grasp spherical bodies, and take up any object in the hand, in giving a firm hold on whatever we seize, in executing all the mechanical processes of the arts, in writing, drawing, cutting: in short, in a thousand offices, which occur every moment of our lives, and which either could not be accomplished at all, if the thumb were absent, or would require the concurrence of both hands, instead of being done by one only.—Hence it has been justly described by Albinus as a second hand, "manus parva majori adjutrix."

All the simiæ possess hands; but the most distinguishing part, the thumb, is slender, short, and weak, even in the most anthropomorphous: regarded as an imitation of the human structure, it would almost justify the term applied to it by Eustachius—"ridiculous." The other fingers are elongated and slender.

The comparison which I have already drawn between the construction of the hand and foot, having shown that the latter is merely calculated for support in man, we may state that he is two-handed and two-footed, or bimanous and biped.

Monkeys, apes, and other anthropomorphous animals, can, in fact, be called neither bipeds nor quadrupeds; but they are quadrumanous, or four-handed. They have opposable thumbs on the lower as well as upper extremities; and thus their feet are instruments of prehension as well as their hands.

We may now answer the question, whether the orang-outang and other simiæ go erect, or on all-fours; they do neither, but live chiefly in trees, for which they are admirably adapted by having prehensible members, instruments for grasping and holding, on both upper and lower extremities. Hence Cuvier calls them "les grimpeurs par excellence." They live in trees, and find their food in them: they can hang by one fore or hind leg, employing the remaining members in gathering fruit, or in other offices. Those which have less perfect hands are furnished with prehensive tails, by which they can be more securely supported in trees.

It is well remarked by the author, that when we see monkeys walking erect, it must be ascribed to instruction and discipline. But as some persons have been found to contend that man ought to go upon all fours, so there are others who undertake to prove that the orang-outang, and the monkey tribe in general, have an organization suited to biped progression. In reply to these the author cites the testimony of the most respectable naturalists to the contrary; but, deeming the evidence drawn from anatomy sufficiently satisfactory, we think it unnecessary to refer to them.

In Chapter IV. Mr. L. introduces the comparison of the hu-

man head and teeth to those of other animals, with the following remarks:

When we consider that the head affords a receptacle for the organ of the mind, that it lodges the principal external senses, as well as the instruments for the procuring, receiving, masticating, and swallowing the food, and a considerable part of the apparatus employed in producing sound, we shall not be surprised at the striking differences in its construction, at those proportional developements or contractions of its several parts, which determine the faculties and endowments of different animals, and their relative rank in the scale of nature. The most convenient position for this important assemblage of organs—including the chief means by which we are connected, actively or passively, with the external world—must exhibit corresponding varieties. A situation is required, combining firmness of support with freedom of motion, a ready communication of the senses with their appropriate external objects, and a corresponding arrangement of the entrances to the respiratory, digestive and vocal cavities. The mode in which the entire mass is articulated and supported must therefore be varied according to the predominance or contraction of the various particular organs, as well as in conformity to the attitude of the animal, and the distribution of other parts, particularly the upper limbs. As the proportions of its parts in the human subject indicate a predominance of the organ of thought and reflection over the instruments employed in external sensation, and the supply of merely animal wants, which places man at the top of the intellectual scale; so the position of the whole, and the arrangements for its support and motion, are calculated, like all the details of organization hitherto examined, in reference to his peculiar distinction of the erect attitude.

A very striking difference between man and all other animals consists in the relative proportions of the cranium and face, which are indicated in a general, but not very accurate manner, by the facial line.

One of the most simple modes of expressing the relative proportion of these parts is by the direction of the *facial line*, and the amount of the facial angle. Supposing a skull to be at rest on the occipital condyles, and neither inclining backwards nor forward, a line drawn from the greatest projection of the forehead to that of the upper maxillary bone, is called the *facial line*; and the angle formed by the intersection of this line by a horizontal line, is called the *facial angle*. In man the face is placed under the forehead, and consequently, the facial line will be nearly perpendicular, and the facial angle will approach a right angle: as we recede from man, among the lower orders of animals, the prominence of the forehead diminishes, and that

of the jaws increases; consequently, the size of this angle will give a general idea of their relative developement.

In man, the facial angle varies from 65 to 85 in the adult, but the ancient Greeks aware of the intellectual character which a prominent forehead gave to the countenance, in their statues have extended it to 90, and even to 100.

A vertical section of the head, in the longitudinal direction, shews more completely the relative proportions of the face and cranium.

The human and brute face are not more strongly contrasted in size, and in their relation to the cranium, than in their general configuration, and the uses to which they are subservient. The former is an organ of expression, an index to the varying passions and emotions of the mind, imparting a more accurate idea of the moral feelings and character than words can convey. The latter is devoted to merely animal purposes, an instrument for procuring and masticating the food, and often a weapon of offence and defence.

The want of the intermaxillary bone has been assigned by Camper, as one of the characteristics of the human head. The superior maxillary bones of the human subject are united together, and contain the whole of the teeth; but in the mammalia they are separated by a third bone, containing the incisor teeth, and which was called os incisivum. Since, however, it is found in animals which have no incisor teeth, Blumenbach has, more appropriately, called it os intermaxillare. This bone is wanting only in a few of the most anthropomorphous monkeys.

Another distinction between man and animals is found in the articulation of the head with the spine. As the peculiarities of the human body require a very limited extent of motion in the head; the articulation alluded to is placed very nearly in the centre of its base—an arrangement which very much facilitates its support in the erect position. In animals, on the other hand, whose jaws are almost universally used as instruments of prehension, this articulation is placed very nearly or quite at the

back part of the head, so as to admit of the greatest possible extent of motion.

The teeth of man are distinguished by being all of one length, and by being arranged in a uniform and unbroken series, and by the inferior incisors being perpendicular, and placed in the same vertical line with the front of the jaw. The obtuse tubercles of the grinders also are peculiar, neither resembling the flat crowns of the herbivorous animals, nor the cutting and tearing grinders of the carnivorous animals; but partaking of the nature of both, and therefore adapted to that mixed diet to which an unerring guide prompts him to resort.

The chin is peculiar to man, and exists as a necessary consequence of the inferior incisors being perpendicular.

In chapter V, Mr. L. in remarking upon the differences in stature and proportion, between man and the simiæ, presents the following strong points of contrast.

The great length of the upper limbs, the predominance of the fore-arm over the upper-arm, the shortness of the lower limbs, and the great length of the hands and feet, are other striking characters of the monkey kind.

The span of the extended arms in man equals the height of the body: it is nearly double that measure in the anthropo-morphous monkeys.—Our upper arm is longer than the fore-arm by two or three inches; in the last mentioned animals, the fore-arm is the longest. In us, the hip-joint divides the body equally; the lower extremity is less than half the height of the body in monkeys. The proportion of the hand and foot to the body is much greater in them than in us; the excess arising from increase in the length of the phalanges. That all these circumstances are very suitable to the climbing habits of the monkey-race, is too obvious to require particular elucidation.

In a monkey of two feet two inches, the humerus measured four and a quarter, the ulna five inches.

The upper extremities of the pongo of Borneo, reach to the ankles, when the animal is erect: its ulna, in the College Museum, is 15 3-4 inches long; the whole height certainly not exceeding five feet. The man, whose gigantic skeleton is preserved in the same place, was eight feet four inches: the ulna, however, is only 13 3-4 inches.

The upper limbs of the gibbon touch the ground when the animal is erect.

The smoothness and nakedness of the human skin furnishes another ground of distinction, "and this circumstance," says the author, "with the absence of all fur, spines and bristles, &c., and the want of those natural offensive weapons, fangs, tal-

ons, claws, &c., justify us in denominating the human body as naturally unarmed and defenceless. The deficiency is amply made up by the internal faculties, and the arts to which they give rise."

The following account of some minor points of difference are worthy of notice.

In comparing man with the anthropo-morphous simiæ, it must be noticed further, that one species (satyrus) has no nail on the thumb of the hind hand; and the other, (troglodytes,) according to Tyson, has thirteen ribs. Both of them have a sacrum composed of three pieces only, instead of five, as in the human subject. One at least (satyrus) has one or two large membranous pouches on the front of the neck, under the platysma myoides, communicating with the cavity of the larynx, between the os hyoides and thyroid cartilage, and capable of distention and evacuation at the will of the animal. It has no ligamentum teres in the hip-joint. It has a membranous canal running along the spermatic cord from the abdomen to the tunica viginalis as other monkeys and quadrupeds have; but this does not exist in the chimpanse. The roof of the mouth is nearly black.

I venture to assert that the differences only which have been just enumerated, without any others, would be amply sufficient to establish the dictinction of species; that no example can be adduced of animals deviating so far from the original model of their structure as to exhibit varieties like those just enumerated; and consequently, that the differences in question can be accounted for only by referring the animals to species originally distinct.

There are some points in which man has been erroneously supposed to differ from animals. The approximation of the two eyes is not peculiar; they are much nearer together in the simia.

Many other mammalia, particularly among the quadrumana, have cilia in both eyelids; this is the case in the elephant.

Although the prominent nose, is a striking character of the human face, particularly in comparison with the monkeys, whose very name (simia, from simus) is derived from the flatness of this part, there is a species considerably surpassing man in the length of this feature;—the long-nosed monkey, s. rostrata, or nasalis.

The external ears are not incapable of motion in all men; nor are they moveable in all other mammalia: in the ant-eaters, for example.

Many quadrumana have an organ of touch, and uvula, as well as man.

Again there are some parts, which man alone, or with a few other mammalia, does not possess. Most of these, which are found chiefly in the domesticated kinds, were formerly attributed to man, when human dissections, from want of opportunities, were uncommon.

The paniculus carnosus, or thin subcutaneous stratum of muscular

fibres, covering the ventral and lateral parts of the trunk immediately under the skin,—described by Galen and his followers, and even by Vesalius, the great restorer of anatomy and exposer of Galen's errors, as a part of the human body,—does not exist in man, nor, according to Tyson, in the chimpanse. It is found in the monkeys.

The rete mirabile of the cerebral arteries, included by Galen among the parts of the human body, was shown by Vesalius, not to belong to the human structure.

The seventh or suspensory muscle of the eyeball, which is found in the four-footed mammalia, is not seen in man, as Fallopius observed; neither is the alantois or membrana nictitans.

The brain of man forms a remarkable point of contrast between him and other animals. With the exception of the elephant, his brain is much larger than that of any other terraqueous animal. A mode of comparison, however, evidently more satisfactory than that derived from the absolute weight of the brain, is to be found in the ratio which this viscus bears to the body. Modern physiologists, however, have been very much perplexed by finding that several of the mammalia equal man in this mode of comparison, and that some of the small birds even exceed him. To remove this difficulty, Soemmering has suggested a new point of comparison, viz. that of the ratio which the mass of the brain bears to the bulk of the nerves arising from it. Thus if we divide the brain into two parts, the first of which being connected with the nerves, is devoted to those wants and purposes which we have in common with the animals; the second will include the part of the brain which may be considered as the seat of the mental phenomena.

In proportion, then, as any animal possesses a larger share of the latter and more noble part,—that is, in proportion as the organ of reflection exceeds that of the external senses,—may we expect to find the powers of the mind more diversified and more fully developed. In this point of view man is decidedly pre-eminent; although in his senses and common animal properties, he holds only a middle rank, here he surpasses all other animals that have been hitherto investigated: he is the first of living beings. "All the simiæ," says this accomplished anatomist, "for I have been fortunate enough to procure specimens of the four principal divisions, come after him; for although the proportion of their brain to the body, particularly in the small species with prehensile tails, is equal to that of man, their very large eyes, ears, tongue, and jaws, require a much larger mass of brain than

the corresponding parts in the human subject; and if you remove this, the ratio of the brain to the body is much diminished.

"Animals of various kinds seem to me to possess a larger or smaller quantity of this superabundant portion of brain, according to the degree of their sagacity and docility. The largest brain of a horse, which I possess, weighs one pound seven ounces; the smallest human brain that I have met with in an adult, two pounds five ounces and a quarter.' But the nerves in the basis of the horse's brain are ten times larger than in the other instance, although it weighs less by fourteen ounces and a quarter.

"But we are not hastily to conclude that the human species have smaller nerves than any other animals. In order that my ideas may be better understood, I shall state the following imaginary case.—Suppose the ball of the eye to require 600 nervous fibrils in one instance; and in another, half the size, 300: further, that the animal with 600 fibrils possesses a brain of seven, and that with 300 a brain of only five drams. To the latter we ought to ascribe the larger brain, and a more ample capacity of registering the impressions made on the organ of vision. For, allowing one dram of encephalon to 100 fibrils, the brain, which is absolutely the least, will have an overplus of two drams, while the larger has only one. That the eye, which is supplied with a double quantity of fibrils, may be a more perfect organ of sense, will be readily admitted; but that point is not connected with the present question."

Upon these different views Mr. L. offers the following remarks:

The basis of the position so much insisted on by Soemmering, is an assumption that a certain bulk of nerve requires always the same proportion of brain for the execution of its office—a datum by no means self-evident. The comparison of the nerves to the *brain* in general is not satisfactory; we should wish to know the relative proportions of the cerebrum, cerebellum, and medulla oblongata. The latter, in deed, is an important point; as most of the nerves are immediately connected with it, few with the cerebrum, and none with the cerebellum, properly so called.

The most striking character of the human brain is the prodigious developement of the cerebral hemispheres, to which no animal, whatever ratio its whole encephalon may bear to its body, affords any parallel.

It is also the most perfect in the number and developement of its parts; none being found in any animal, which man has not; while several of those found in man are either reduced in size, or deficient in various animals. Hence it has been said, that by taking away, diminishing, or changing proportions, you might form, from the human brain, that of any animal; while, on the contrary, there is none from which you could in like manner construct the brain of man.

It approaches the most nearly to the spherical figure. That the nerves are the smallest in proportion to the brain, has been already pointed out: the brain diminishes, and the nerves increase from man downwards. In the fetus and child, the nerves are proportionally larger than in the adult.

The assertion that it has the largest cerebrum in proportion to the cerebellum does not seem to be quite correct. It has, however, the largest cerebrum in proportion to the medulla oblongata and spinalis, with the single and indeed singular exception of the dolphin.

It has the deepest and most numerous convolutions, apparently in consequence of its size, as the purpose of this structure seems to be that of affording a more extensive surface for the application of the vascular membrane, the pia mater. The convolutions become fewer and shallower as the brain diminishes in size; there are none in the rodentia; none in very small brains.

It has the greatest quantity of medullary substance in proportion to the cortical. In the fetus, the cortical is much more abundant than in the adult.

The difference in the position of the heart is familiar to all. On some peculiarities of the pelvis the following remarks are worthy of notice.

The curvature of the sacrum and os coccygis gives rise to the peculiar situation and direction of the sexual organs, and particularly of the vagina in the human female. As these bones are extended in the same straight line with the spine in all other mammalia, the canal of the vagina follows the axis of the pelvis, lies nearly parallel to the spine, and has its external orifice directed downwards or backwards: the orifice of the urethra opens into the vagina itself. These arrangements fully explain to us why brutes discharge their urine behind, why they copúlate backwards, and why parturition is so easy with them.

In these points of structure the monkey kind agree with the mammalia in general, and differ from man. The axis of the vagina is directed downwards in them; the urine is discharged within it (such at least Blumenbach found to be the case in the papio maimon and the simia cynomolgus,) and they are, consequently, retro-mingent and retro-copulant.

The incurvation of the sacrum and coccyx turns the human vagina forwards, so that its axis cuts that of the pelvis nearly at right angles, and its anterior opening is turned forwards: the urethra opens on its upper and front edge, not at all within the canal. Hence the human female differs from all other mammalia in not being retro-mingent and retro-copulant; hence, too, although many inconveniences to which she would have been otherwise exposed, particularly during pregnancy, are obviated, parturition is rendered much more difficult, and a

physical reason is found for that doom under which she labours, of bringing forth children in sorrow and in pain.

Although it cannot be deemed an internal organ, this seems the fittest place for mentioning the hymen, an interesting part of the female structure in many respects, and therefore more noticed and investigated than so small a fold of skin would have seemed to deserve. The general opinion of its non-existence in the other mammalia besides man, and the circumstance of its being found in women only at a particular period of life, and even then not universally, have led many anatomists to deny its existence altogether. The question, however, can be so easily settled by direct evidence, that we are surprised to find Buffon still contesting the point. Though the opinion of this great naturalist is incorrect in point of fact, we cannot but admire the eloquence with which he inveighs against the disgraceful opinions and practices which have prevailed on this subject.

It has been generally asserted that this little part is found only in the human subject. In the female orang-outang, Camper says that the hymen was not apparent, although the individual was very young. Blumenbach informs us that he could neither find any trace of this part, nor those supposed remains of it called carunculæ myrtiformes, in monkeys or baboons; and that his search was equally fruitless in a female elephant, in which it had been reported that a hymen existed. Cuvier, on the contrary, represents that several mammalia have a distinct membranous fold at the entrance of the vagina, and others a decided contraction in the same situation.

The clitoris and the nymphæ have been supposed peculiar to the human female, as well as the hymen; the latter, indeed, are generally absent in the mammalia; but Blumenbach informs us that a lemur, which he kept alive for many years, had them very closely resembling the human. The clitoris seems to be universally found in the mammalia: it is very large in the monkey kind, and in the carnivora; and Blumenbach saw it of the size of a fig in a balæna boops, stranded on the coast of Holland.

Man is not less remarkable for that peculiarity of his economy, which enables him to adapt himself to every variety of situation and clime. "The neighborhood of the pole and the equator, high mountains and deep valleys, are occupied by him; his strong but pliant body bears cold, heat, moisture, light or heavy air; he can thrive any where, and runs into less remarkable varieties than any other animals which occupy so great a diversity of abodes."

The Greenlanders and Eskimaux reach to between 70 and 80 deg. of north lat., a climate in which mercury freezes, and expose themselves to a degree of cold which even the polar bear

seems incapable of supporting; and even the natives of temperate climates have sustained the winters of these high latitudes with impunity. On the other hand, men can live in a climate where the thermometer rises to 100, 110, or 115, and have borne with impunity, for a short time, a temperature superior to that of boiling water.

The varieties of climate to which his condition can be accommodated is not greater than the change of diet which these different locations require, to preserve the body in a healthy condition. The intention of nature in providing a rich supply of vegetable food for the inhabitants of tropical regions, is not more obvious than is the necessity for animal food in its most stimulating form, for the inhabitants of high northern latitudes. The Greenlanders drink the blood of the seal when warm, and eat his flesh when raw or half putrid, with the keenest relish; and whale oil as a luxury is sought after with an avidity scarcely less than the more potent stimulus of ardent spirits.

In temperate climates man indulges with impunity in every variety of diet, and although whim, caprice, or superstition has given rise to many opinions upon the subject of the injurious tendency of an exclusive animal or vegetable food, experience does not justify the opinion that it exerts any material influence over the physical, moral, or intellectual faculties.

The following extract is not less beautiful in its style, than correct in its reasoning.

Vegetable diet is as little connected with weakness and cowardice, as that of animal matters is with physical force and courage. That men can be perfectly nourished, and their bodily and mental capabilities be fully developed in any climates by a diet purely vegetable, admits of abundant proof from experience. In the periods of their greatest simplicity, manliness, and bravery, the Greeks and Romans appear to have lived almost entirely on plain vegetable preparations: indifferent bread fruits, and other produce of the earth, are the chief nourishment of the modern Italians, and of the mass of the population in most countries of Europe: of those more immediately known to ourselves, the Irish and Scotch may be mentioned; who are certainly not rendered weaker than their English fellow-subjects by their freer use of vegetable aliment. The negroes, whose great bodily powers are well

known, feed chiefly on vegetable substances; and the same is the case with the South-Sea Islanders, whose agility and strength were so great, that the stoutest and most expert English sailors had no chance with them in wrestling and boxing.

The representations of the Pythagoreans respecting the noxious and debilitating effects of animal food, are, on the other hand, the mere offspring of imagination. We have not the shadow of a proof, unless we admit Ovid's Metamorphoses and other poetical compositions, that this state of innocence, of exalted temperance, and of entire abstinence from flesh, of perfect tranquility, of profound peace, ever existed, or that it is more than a fable, designed to convey moral instruction. If the experience of every individual were not sufficient to convince him that the use of animal food is quite consistent with the greatest strength of body and most exalted energy of mind, this truth is proclaimed by the voice of all history. A few hundreds of Europeans hold in bondage the vegetable-eating millions of the East. If the Romans, in their earliest state, employed a simple vegetable diet, their glorious career went on uninterruptedly after they had become more carnivorous: we see them winding their way, from a beginning so inconsiderable that it is lost in the obscurity of fable, to the empire of the world: we see them, by the power of intellect, establishing that dominion, which they had acquired by the sword, and producing such compositions in poetry, oratory, philosophy, and history, as are at once the admiration and despair of succeeding ages: we see our own countrymen rivalling them in arts and in arms, exhibiting no less signal bravery in the field and on the ocean; and displaying in a Milton and Shakspeare, in a Newton, Bacon, and Locke, in a Chatham, Erskine, and Fox, no less mental energy. Yet, with these proofs before their eyes, men are actually found who would have us believe on the faith of some insulated, exaggerated, and misrepresented facts, and still more miserable hypotheses, that the developement, form, and powers of the body are impaired and lessened, and the intellectual and moral faculties injured and perverted by animal food.

The comparison of the digestive organs of man to those of other animals, has been supposed to confirm the voice of experience in this respect. Mr. L. however, in the following remarks, seems to take the opposite view of the subject.

The molar teeth being the instruments employed in dividing and preparing the food, must exhibit, in figure and construction, a relation to the nature of the aliment. They rise, in the true carnivora, into sharp-pointed prominences; and those of the lower shut within those of the upper jaw;—when the series is viewed together, the general outline may be compared to the teeth of a saw. These animals are also furnished with long, pointed, and strong cuspidati or canine teeth, which are employed as weapons of offence and defence, and are very serviceable in seizing and lacerating their prey; they constitute in

some animals, as the lion, tiger, &c. very formidable weapons. The herbivorous animals are not armed with these terrible canine teeth: their molares have broad flat surfaces, opposed in a vertical line to each other in the two jaws. Plates of enamel are intermixed with the bone of the tooth in the latter; and, as its superior hardness makes it wear less rapidly than the other textures of the teeth, it appears on the grinding surface in rising ridges which must greatly increase the triturating effect. In carnivorous animals the enamel is confined altogether to the surface of the teeth.

The articulation of the lower jaw differs in the two cases as much as the structure of the teeth. In the carnivora it can only move backwards and forwards; all lateral motion being precluded by the rising edges of the glenoid cavity: in the herbivora it has, moreover, motion from side to side. Thus we observe, in the flesh-eaters, teeth calculated only for tearing, subservient, in part at least, to the procuring of food, as well as to purposes of defence; and an articulation of the lower jaw, that precludes all lateral motion. In those which live on vegetables, the form of the teeth and the nature of the joint are calculated for the lateral or grinding motion. The former, having rudely torn and divided the food, swallow it in masses, while in the latter it undergoes considerable comminution before it is swallowed. The teeth of man have not the slightest resemblance to those of the carnivorous animals, except that their enamel is confined to the external surface. He possesses, indeed, teeth called canine, but they do not exceed the level of the others, and are obviously unsuited to the purposes which the corresponding teeth execute in carnivorous animals. The obtuse tubercles of the human molares have not the most remote resemblance to the pointed projections of these teeth in carnivorous animals: they are as clearly distinguished from the flat crowns with intermixed enamel of the herbivorous molares. In the freedom of lateral motion, however, the human inferior maxilla more nearly resembles that of the herbivora.

The teeth and jaws of man are in all respects much more similar to those of monkeys, than of any other animals. A skull, apparently of the orang-outang, in the Museum of the College, has the first set of teeth; the number is the same as in man, and the form so closely similar, that they might easily be mistaken for human. In most other simiæ the canine teeth are much longer and stronger than in us; and so far these animals have a more carnivorous character. The points and ridges of the molares in simiæ are distinguished by their sharpness, from the peculiar obtuse tubercles of the human molares.

The length and divisions of the alimentary canal are very different according to the kind of food. In the proper carnivorous animals, the canal is very short;* the large intestine cylindrical, and the cæcum, not larger than the rest. The form of the stomach and the dispositions of its openings are calculated to allow a quick passage of the food. In

*The length of the body, in a straight line from the snout to the anus, compared to that of the intestines, varies in the carnivora, according to Cuvier, from 1: 3 to 1: 5. 8; excepting the hyæna, where it is as 1: 8. 3. "Lec. d'Anat. Comp." iii. 450.

the herbivora, the whole canal is long;* and there is either a complicated stomach, or a very large cæcum, and a sacculated colon: the stomach, even where simple, is so formed as to retain the food for a considerable time.

In comparing the length of the intestines to that of the body, in man and other animals, a difficulty arises on account of the legs, which are included in the measurement of the body in the former, and not in the latter. The great depth of the cranium in man makes a further addition to the length of body, and thereby diminishes the proportion which the intestine bears to it. As our legs are half the height of the body, that should be reduced one half, when it is compared to that of animals measured from the head to the anus; or the length of the intestines may be doubled. When allowance is made for this circumstance, man will be placed nearly on the same line with the monkey race, and will be removed to a considerable distance from the proper carnivora. Soemmering states that the intestinal canal of man varies from three to eight times the length of the body. In Tyson's chimpanse of twenty-six inches, the canal measured one hundred and fifty-nine inches, or about six times the length of the body. In two sapajous and two monkeys, the intestines were respectively 62 and 96 inches; as the body is said in all to have been about 14 inches from the head to the anus, its proportion to the intestines will be in the former as 1: 4 6-14, in the latter as 1: 6 12-14. From these as well as other instances, it is apparent that the comparative length of the alimentary canal in simiæ, is less than in man.

The form of the stomach and cæcum, and the structure of the whole canal, are very much alike in man and the monkey kind. The orangs (S. satyrus, troglodytes, and gibbon) have the appendix vermiformis, which the others want.

Thus we find, that whether we consider the teeth and jaws, or the immediate instruments of digestion, the human structure closely resembles that of the simiæ; all of which, in their natural state, are completely herbivorous.

Man possesses a tolerably large cæcum, and a cellular colon, which, I believe, are not found in any carnivorous animal.

I do not infer from these circumstances that man is designed by nature to feed on vegetables, or that it would be more advantageous to him to adopt that diet. The hands and the arts of man procure for him the food which carnivorous animals earn by their teeth. The processes of cookery bring what he eats into a different state from that in which it is employed either by carnivorous, or herbivorous animals. Hence the analogy in the modes of procuring and preparing food is too loose for us to place much confidence in the results of these comparative views. We must trust to experience alone for elucidating the great problem of diet: its decision has been long ago pronounced, and will hardly now be reversed.

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*In the ruminantia, the comparative lengths of the body and intestines vary between 1: 11 and 1: 28; in the solipeda, between 1: 8 and 1: 10. Ibid. 453 and 4.

In relation to the power of man to accommodate his constitution to every variety of climate, the question is frequently asked, whether it depends upon physical endowments, upon the strength and flexibility of the human frame, or whether it arises from the protection which human art and contrivance give him against the elements which surround him. In reply to this, it may be remarked, that man evidently derives great advantage from his reason and foresight, but he derives no advantage from those which nature has not bestowed upon many other animals, in giving them instincts as unerring as the dictates of reason. Nature either in their organization, habits, or in the food upon which they subsist, has assigned to all animals limits which they cannot pass. The dog, only, follows his master into every climate, but it requires several generations to produce the requisite changes of bodily structure, and other properties, and when these are effected, the characters of the animal are so modified, that the identity of the species can scarcely be recognized.

The menstrual discharge is peculiar to women. The popular notion which extends this discharge to other animals, will scarcely stand in competition with the opinion of Blumenbach.

"I know, indeed," says Blumenbach, "that the same discharge has been ascribed to other animals, particularly of the order quadrumana. I have carefully inquired about all the female monkeys, which I have seen for these twenty years, either in menageries or carried about for public exhibition, and have found some of them liable to uterine hæmorrhage which observed no period, and was regarded by the more intelligent keepers as a circumstance arising from disease; although they acknowledged, that, in order to excite the admiration of their visitors, they often represent it as true menstruation."

The *intellectual faculties* of man constitute a more important ground of distinction between him and other animals, than any to which we have yet referred. By the aid of these he has reduced the animal kingdom to subjection, and made it tributary to his wants and his luxuries, and supplementary to the defects of his physical organization; he has made himself acquainted with the principle of the most mysterious operations of na-

ture, and divested them of their power to annoy him, or rendered them, in an infinite variety of ways, subservient to his convenience; he embodies the operations of these noble faculties in language, and thus appropriates to each individual the united discoveries of a whole society. They have enabled him to invent a still more wonderful written language, to serve as a medium of communication between distant nations and generations, circulating the benefits of individual discovery, and perpetuating them to become the ground work of successive inventions, until their united contributions have so improved the condition of mankind, as to impose a new face upon their moral and social relations, and to invest those who enjoy these advantages with a character and attributes so superior to the untutored savage, that the identity of the species is scarcely recognized.

Man is not less distinguished by his *social feelings* than by his intellectual faculties. Animals are brought together by *instincts* sufficiently powerful to preserve the bond of union, when necessary for their common safety, or for the reproduction of the species. In addition to this animal impulse, in human society, the social principle is strengthened by innumerable associations, which modify it in such a manner, that the original instinct is almost lost sight of in the amiable sympathies, and ardent feelings, which it is the occasion of producing.

In most of the feelings of which other individuals of the species are the subjects, and in all which come under the denomination of moral sentiments, there is a marked difference between man and animals, and a decided inferiority of the latter. The attachment of the mother to the offspring, so long as its wants and feebleness require her aid and defence, seems as strong in the animal as in the human being, and bears equally in both, the characters of actions termed instinctive. Its duration is confined in the former case, even in social animals, to the period of helplessness; and the animal instinct is not succeeded, as in man, by that continued intercourse of affection and kind offices, and those endearing relations, which constitute the most exalted pleasures of human life.

Of courage, the animal kingdom offers many examples; and the moralists have celebrated the attachment of the dog to his master. It may be doubted whether he can find any instance of such feeling between animals themselves, excepting some cases of sexual unions.

In general, they seem entirely destitute of sympathy with each other, indifferent to each other's sufferings or joys, and unmoved by the worst usage or acutest pangs of their fellows. Indeed, if we except some associated labors in the insect class, principally referring to the continuation of the species, and securing a supply of food, and some joint operations of the male and female in the higher classes, animals seem entirely incapable of concert or co-operation for common purposes, of combining various exertions for the attainment of a common end. This appears to arise from the limited nature and extent of their knowing and reflecting powers; to which, probably, we must refer their incapability of conceiving moral relations.

Laughing and weeping are natural signs in man of certain mental affections, and probably are also peculiar to him; animals are not susceptible of the emotions or states of mind indicated by these external signs.

Man is also distinguished by the moral ties which unite him to his Creator—ties which so invariably exist, in every form of human society, that we must believe their germs to be implanted in the constitution of our minds, by the author of our existence, to spring up, with or without culture, with such a degree of luxuriance, and so entwining themselves with our social and domestic relations, that they can only be eradicated by a long course of crime, or a deliberate perversion of the intellectual faculties. The habitual influence of this *moral principle* constitutes one of the most effectual preservatives of social order, and although its influence may pass unobserved among the numerous principles which combine to modify and regulate the human character, yet, if its salutary restraints were removed, the violence of human passions would convert society into a field of blood. Attempts have been made to throw a doubt over the existence of this important principle, by referring to the terrible excesses which its unenlightened and misguided energies have produced. But would any one doubt the existence of our animal propensities because their unrestrained indulgence produces disease, or can the examples of cruelty and revenge, which result from the partial or perverted operation of our social faculties, justify us in denying that they act at all. Upon the same principle do the cruelties of superstition and bigotry afford additional evidence of a truth universally acknowledged by the "savage and the sage," except where the heart has

been corrupted by vicious indulgence, or the judgment, by vain speculation, been led to despise the simple dictates of nature.

It savours as little of sound philosophy to question the existence of a principle because its perfect development and legitimate influence can only be realized by the most assiduous cultivation. The most valuable gifts of God to man are slow in their growth, precarious in their tenure, and followed in their abuse by the most pernicious consequences. The animal feelings which are immediately necessary to individual preservation, appear simultaneous with birth, before the heart can feel, or the judgment comprehend the social relations. But these propensities are but the germs of those powerful instincts which direct the lower animals with so much certainty, to the fulfilment of the objects of their creation, and prove, by the subordinate station which they occupy in man, that he is intended for nobler purposes than to occupy and perpetuate an isolated animal existence.

The sympathetic feelings are to the community, what the animal propensities are to the individual: slower in their growth, and requiring, in order to their full development, a more careful nurture, they evince, when thus cultivated, by their powerful control, the superior importance which Providence attaches to our social relations.

Out of these relations insensibly springs the sense of the obligations which man owes to a superior being—a feeling which requires so much cultivation and so happy a combination of circumstances in order to its full developement, that its pure and perfect influence upon the human character is almost never witnessed; but still evincing, by the necessity of its existence to the preservation of society, the noble destinies which await us on the termination of this transitory existence.

The vagary of *innate ideas* has long since been exploded. We can no more conceive of our moral obligation to God, without some knowledge of his character and attributes, than we can feel the sympathies of a child without having experienced the tenderness of a parent: Yet the absurdity of supposing the existence of attributes without an object, is scarcely exeelled by

that of the philosopher who questions the existence of a principle, from the facility with which he can trace its origin.

We have been led into this train of remark by the fact, that the author has *cautiously* avoided all allusion to this important principle—an omission of the more consequence, on account of the charge which is often made (we believe unjustly,) of the tendency of our profession to foster principles unfavourable to morality. F.

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ART. VIII.—*Practical Essays on Medical Education, and the Medical Profession, in the United States.* By DANIEL DRAKE, M. D., Professor in the Medical College of Ohio.—Cincinnati, Roff & Young.

The Essays originally published by Dr. Drake in this Journal, on the subject of Medical Education, and the Medical Profession, have been republished by the author in a separate form, with three additional Essays—On the Causes of Error in the Medical and Physical Sciences—On Legislative Enactments—On Professional Quarrels. Any recommendation of this work from us, would be superfluous. The Essay on the Causes of Error in the Med. and Phys. Sciences has been written by the author in one of his happiest moods, and should be read with care by every one interested in the advancement of the honor and dignity of the profession. F.

# MISCELLANEOUS INTELLIGENCE.

## ANALECTIC, ANALYTICAL, AND ORIGINAL.

### I. ANALECTIC.

1. *The Nature and Cure of the Indian Cholera.*—It behooves every medical practitioner to watch with eagle eye the progress of this dreadful malady, and to treasure up in his mind every incident in its history which may aid in forming philosophical views with regard to its treatment. It will not therefore be with indifference that the reader will peruse the following remarks, which we derive from a late number of that able London periodical, "the Englishman's Magazine."

The Indian or Spasmodic Cholera, is a disease quite distinct from the Bilious Cholera which is common in this country and in Great Britain in hot seasons, and the author commences by pointing out the distinctive characters of these two diseases.

The generic appellative, *cholera*,* is radically derived from a Greek word signifying bile. The title was appropriated in consequence of one of the most prominent symptoms being either a redundant flow of bile into the intestines, accompanied with evacuations of a *bilious fluid*, characterizing *Bilious Cholera;* or a total absence of bile in the intestines, with evacuations of a *watery fluid*, characterizing *Spasmodic Cholera.* These symptoms are so completely opposed to each other in the quality of the fluid discharged, that attending to them alone, will, in general, preclude the possibility of confounding the two species.

In this country, the more severe forms of Bilious Cholera usually occur in the latter end of summer, or the beginning of autumn. At these periods, the extreme heat of the sun stimulates the liver to an increased secretion of bile, which, flowing in excess through the biliary canals, accumulates within the intestines. In the condition of health, a certain quantity of bile is a necessary adjuvant to the perfecting of the digestive process; but, like other natural secretions, when above or below the salutary measure, it becomes the cause or the indication of diseased action.

* Cholera *Morbus*, the vulgar name, is an absurd pleonasm.

The opening symptoms of Bilious Cholera, are simply the efforts of nature to expel the superfluous bile from the system. The patient complains of nausea and universal languor, to which, retchings and evacuations of a bilious fluid quickly succeed. There is also thirst, restlessness, and pain. In many cases, occasional cramps are experienced in the limbs, resulting doubtless from the irritating effects of the bile upon the internal surface of the intestines. Of spasmodic action, induced in different parts of the body in an analagous manner, there is conclusive evidence. In children, convulsions are often excited by the irritation of worms, or indigestible matter lodged in some part of the alimentary canal.

A knowledge of the nature and seat of a disease will lead to a judicious plan of medical treatment. The course to be adopted here is very obvious. There are two objects to be attained. One, to dilute and remove the irritating fluid from the bowels; the other, to allay the thirst, pain, and spasms. The first indication is followed in the free exhibition of mucilaginous liquids, and the use of an occasional purgative; to compass the second, anodyne medicines and refreshing drinks should be administered. When properly treated in the beginning, it is very seldom indeed, under ordinary circumstances, that cases of Bilious Cholera prove fatal. The disease is acute for the time it endures, but generally it is subdued in three or four days, and the patient recovers with nearly the same rapidity that he fell sick. There are periods upon record, however, in which the malady assumed a more dangerous tendency, in consequence, probably, of a peculiar constitution of the atmosphere with regard to heat, moisture, &c., or properties unknown. In 1669, Sydenham describes the Bilious Cholera as unusually prevalent and severe, carrying off many victims in the space of twenty-four hours.

*Spasmodic Cholera*, is strongly distinguished from the preceding species by the intractable nature of the malady itself, and by the greater intensity of some symptoms common to both, as well as by the features, which confer upon it a distinct specific existence. Spasmodic Cholera is practically unknown in England, but in India it is indigenous. The attack is usually most insidious and sudden. Persons who may have felt perfectly well during the day, in the course of the night or early in the morning are seized with a feeling of uneasiness, which is at first rather a general sensation than referable to any part. To this succeed, at irregular intervals of time, a sensation of heat in the region of the stomach, nausea, constant evacuations from the stomach and bowels of a fluid bearing a striking similitude to water in which rice had been boiled, cramps of the muscles of the fingers and toes, which gradually ascend along the limbs to the trunk. Finally, the muscles of the chest and belly are included in the circle of spasmodic movement, the more violent symptoms continue to persecute the patient, until his strength is unable longer to sustain them. In the last stage of the disease, he is emancipated from the vomiting and spasms, through the complete exhaustion of physical power. With this change, however, he expresses himself greatly relieved, and he may yet survive for a considerable period, his mind remaining unimpaired amid the wreck of the corporeal functions.

A physician conversant with cases of Spasmodic Cholera, will often be competent to recognize an approaching attack in the expression of the patient's face, before that he is himself conscious of the least alteration in his appearance or sensations. His features seem sharper than natural, and there is an air of repressed anxiety in his countenance. If his attention be called to the fact, he will then perhaps say that he does not feel altogether as easy as in general, but that he cannot account for the impression. The changes which the pulse and skin undergo, in the more obvious stages of the malady, are very remarkable, and will not fail to strike the attention of the most superficial observer. At first, the pulse is rapid, small and weak. When the spasms are established, it becomes, during the paroxysms, imperceptible in the limbs, and for some time before death no pulsation can be detected in these parts. The inability to carry on the circulation in the superficial textures, allows the blood to accumulate and oppress the internal organs. On post-mortem examination, the different viscera, particularly the liver and lungs, are found gorged with thick, dark-colored blood, showing that the eliminating processes of respiration and secretion had been very imperfectly performed. The surface of the body, at the commencement of the disease, is pale, chilled, and clammy. In the advanced stages, it is quite cadaverous.

The first case of Spasmodic Cholera that challenged our professional skill, occurred at Calcutta. The symptoms were sufficiently marked to make a lasting impression upon the mind of a practitioner hitherto practically unacquainted with an enemy so obstinate and so accustomed to triumph.

The patient, Mr. A——, an European, only a few months transplanted from England, was a middle-aged man, of spare, but muscular proportions. The evening previous to the attack, he had been abroad enjoying the society of some friends, and, contrary to his general habits, he had indulged in the rather free use of spirituous liquors. The party separated about one o'clock. Mr. A——, the distance being short, travelled home in a palankeen. Upon reaching his residence, he did not retire directly to bed, but took a seat in the verandah "to cool himself." In this state of exposure to the night air, he fell asleep. He slept soundly until awakened, an hour afterwards, by his servant, who reminded him of the propriety of going to bed. Either from the disease not being perceptibly manifested, or from impaired sensibility, Mr. A—— was not then conscious of any morbid affection. After slumbering in bed, however, for a couple of hours, he awoke suddenly with a start, complaining of mental anxiety, and a feeling of uneasiness at the region of the stomach, which he attributed to unpleasant dreams, and to the effects of wine. But the anxiety increased, and the uneasiness changed into a feeling of burning heat. In the lapse of four hours, evacuations of the portentous fluid, like rice water, followed, from the stomach and bowels, to which were soon superadded distressing cramps, affecting the muscles of the toes. The character of the affection was now evident to the patient himself, though almost a stranger to the climate and its di-

seases. To afford medical assistance, we were immediately summoned. The summons was quickly obeyed, but, in the interim, the advance of the disease had surpassed our rapidity.

On arrival, we found that the patient had been unable longer to endure confinement in bed. The cramps had extended upwards to the calfs of the legs; they were also simultaneously experienced in both arms. So violent were the spasms, that he had rolled in torture upon the floor. At the time we entered, he was gathered into a corner of the apartment, and he presented an appalling spectacle of internal agony. His person, sparingly concealed in a night-garment, bore, in its spasmodic contraction, a resemblance to the letter S. Assisted by a couple of servants, and by pressing his bent extremities against the angular walls, he labored in the extreme exertion of voluntary force to subdue the involuntary action of the rebellious muscles. The expression of his face at that moment, lives distinct in our recollection; and even there, though seen through the mist of receding years, it is painful to dwell upon.

To convey to the reader a faint idea of the death-struggle then maintained, we should liken Mr. A—— to a traveller, who, falling unwarily upon the tiger's lair, rallies every nerve to secure a temporary respite. His inevitable fate is briefly procrastinated by the convulsive grasp which holds the throat of the savage in momentary subjection. Such was the danger—such the desperation stamped upon the countenance of our patient. His features were sharp and hollow. His teeth clenched in breathless agony. The blood had retreated from his cheeks and lips. His limbs were doubled resistlessly by the remorseless spasms.

In a few minutes, a remission brought partial relief. In occasional snatches of expression, he gave us to understand that he was now able to answer the interrogatories we might think proper to propose, with respect to the inward symptoms. These symptoms were the usual concomitants of Spasmodic Cholera in the intermediate stage of its violence. His stomach felt as if it contained a furnace. The thirst was unslakeable. And so complete was the feeling of exhaustion during the interval of mitigated suffering, that he felt unconscious of possessing the slightest control over the motions of any part of his physical structure.

Medical men have been collectively accused, by the indiscriminating multitude, of defective sympathy towards the sons and daughters of bodily affliction. Habituated, it is said, in their daily avocations, to the appeal of the unfortunate, they are at last led to conceive the heart-pang of the patient to be as unsubstantial as the words in which it is expressed. The charge is untrue. In no class of educated people will there be found a greater proportion of "hands open as day to melting charity," than might be discovered among the members of the medical profession, were their kind acts performed in the market-place, instead of the gloomy recesses of morbid destitution. Men in the general walks of life may annually exhibit their measured benevolence in public places, and shed the unfrequent tear of commiseration in their hasty transit through a hospital; but it is the

province of the practitioner to do something more than this. It is his duty to linger long with the distressed, to bind in solitude their bleeding wounds, and when hope has departed, never to return, to wear her cheering portraiture, that the abrupt and rugged path leading to dissolution may not too hastily reveal the extremity of danger.

To our patient, laboring under a violent and advanced attack of Spasmodic Cholera, no solid expectation of recovery could be extended. Every means, however, sanctioned by recorded experience, was tried to compass a favorable change. Respecting the final issue, he was himself little if at all solicitious. The immediate suffering, particularly from the spasms, absorbed both sense and soul. He praved imploringly to be relieved, either by energetic treatment or by death, from the intolerable cramps that threatened to tear him into pieces.

Brief was the interval between supplication and repose. The resources of nature were exhausted in detail. The spasms which had eventually ascended to the body, finally yielded to debility, that proved alike prostrating to the actions natural and diseased. The vomiting ceased to harass, the pulse was no longer susceptible in the limbs; even the motion of the heart—that citadel of life, was feeble and indistinct. The surface of the body felt cold and clammy like a corpse, presenting on the hands and feet a corrugated and macerated app arance, as if it had been steeped in water for some days.—The breath grew chill. The eye was glazed. In this state, notwithstanding, he lived several hours, and then expired without a struggle.

The case of Mr. A—— is a common specimen of the progress of the disease to a fatal termination. It included thirteen hours from the first feeling of uneasiness, until he breathed his last. Cases, however, are continually occurring, in which the duration of the malady extends to twenty-four hours. Some beyond that. On the other hand, many patients are carried off with singular rapidity. In the history of the Epidemic, instances are numerous of soldiers falling in the line of march and dying instantly, as if seared by lightning, without having uttered a previous complaint. Mechanics have perished with their working implements in their hands; the Brahmin, also, at his beads, and the Ryot at his plough.

Before mentioning the principles hitherto most successfully pursued in the medical management of Spasmodic Cholera, we shall briefly advert to some of the opinions entertained respecting the causes, remote and immediate, of that terrible distemper. That the reader may comprehend our technicalities of causation, the application of the terms enjoined shall be explained.

The causes of disease admit of two chief divisions. The *remote*, and the *immediate* or *proximate*. It may be permitted for our purpose to illustrate these in the following manner:—A man receives a blow from a stone; the part stricken is bruised; inflammation of the part succeeds. Here the propelled stone is the remote cause of the mischief; the bruise is the proximate cause; and the consequent inflammation forms an array of symptoms, or what is commonly called the

disease. In strictness of language, however, we should not call the inflammation, or third stage, the disease itself; it is merely symptomatic of the previous organic change comprised in the second stage. The proximate cause, therefore, is the real disease, the parent of all that follows. Applying this mode of investigation to the English or Bilious Cholera, it will appear that the heat of the sun is the remote cause of the affection; for, during the maximum of its annual range, the heat stimulates the liver to increased action, and its function becomes accelerated. This functional derangement is the proximate cause; and the augmented flow of bile is merely one of the primary symptoms which, in its turn, gives rise to the secondary train, nausea, vomiting, &c.

As in the two examples just given, every malady will have for its proximate cause either an organic change, or a functional derangement of some part of the body. But in many cases we are not aware of the precise nature of that change, or the exact seat of that derangement. It is also often impossible, from the minuteness of the field of research, and the imperfection of our senses, to ascertain, by observation or dissection, whether the proximate cause of certain maladies should be referred to alteration of structure, or to supernatural action alone. To this order belong a numerous family of fevers, which are developed in the system spontaneously, or through the influence of a deleterious miasm. The difficulty to which we have alluded, accounts for the various controversies maintained of late years, among medical writers, regarding the primary seat of fever. Some attempted to prove portions of the nervous, others, of the vascular system, to be the first link in the chain of febrile transition. A third party, observing that the brain, in persons who died of fever, frequently presented the aspect of recent inflammation, hastily referred the proximate cause to inflammation of the brain. A fourth, for similar reasons, found it in the lining membrane of the stomach. The more enlightened view, however, of the pathology of fever, demonstrates that the inflammatory appearances observable after death, are the *effects*, and not the cause, of the disease. An opinion, consequently, has been with reason entertained, that the nervous system, not in part, but as a whole, is the radical seat of the morbid phenomena.

The recorded history of Spasmodic Cholera does not reveal to us the reason of the disease changing its character in 1817. Why it should have assumed, at that period, an aspect of extraordinary malignity, has not as yet been satisfactorily explained. The remote and proximate causes of the epidemic are still open to investigation, though several authors have attempted to point them out. Mr. Annesley* seems to think that the remote cause was a peculiar state of the atmosphere, with regard to electricity; that the air was negatively electrical, and that this induced a great diminution of the nervous fluid in the human body, which is in his opinion the proximate cause of Epidemic Cholera.

* Sketches of the most prevalent diseases in India. London: 1829.

Thirteen years have elapsed since Cholera commenced its ravages, and a single experiment cannot be adduced to countenance the existence of the peculiar non-electoral state of the atmosphere. Holding, therefore, his opinion to be perfectly gratuitous, we shall leave Mr. Annesley to the enjoyment of the more solid honors which have been awarded him in the practical department.

Several theoretical writers agree with the practical, in supposing that immediate and increasing diminution of the nervous energy, is the proximate cause of the malady. Dr. Good* does not express his sentiments fully and explicitly upon the subject, but from the little that he says, and as he leaves the opinion uncontroverted, it may be presumed that he was inclined to the same conclusion. Of the remote cause, Dr. Good offers no solution.

To dissent from highly respectable authorities, may be considered in us an act of temerity, both on account of the difficulties appertaining to the question itself, as well as the numerical danger incurred in opposing, to the opinion of the many, that of an individual. Appealing, however, to facts admitted by all, and elucidating these through the light of a clear analogy, we hope to be able to show that, during the first stage of Spasmodic Cholera, the nervous system is not in a state approaching to exhaustion; but, on the contrary, that *it is locally in excess, and to the influence of this excess upon certain parts of the body should the phenomena be ascribed, which externally mark the disease.*

The prevalent opinion, that debility is the immediate cause, probably originated in the medical observers drawing their conclusions erroneously from the effects of the symptoms of Cholera, as had previously been done by others with regard to fever. But it is evident, that in quest of the fountain we should not follow the river to the sea. In whatever stage of the disease the investigation be commenced, we must take the symptoms individually, and ascertain their relations and priority of origin. Guided in this way by the landmarks of observation, we shall finally arrive at a knowledge of the first sensible indication of the morbid action which had been excited within the body, and the next step will be to determine, with the assistance of experience and analogy, the nature of the insensible or hidden derangement, which constitute the proximate cause.

If general nervous debility be the cause of the symptoms, we would ask how it comes to pass that the mind of patients, laboring under Spasmodic Cholera, remains perfectly clear and collected to the last, after the pulse has ceased to vibrate in the limbs, and when death has crossed the threshold of existence? In typhous fever it is otherwise. Here the decline of the cerebral function is evinced in low muttering delirium; in the loss or perversion of the external senses. The ear is mocked by the imaginary fall of waters; the eye deceived by the unsubstantial creations of the brain. The medical treatment, also, found most efficacious in opposing the onset and progress of Cholera, demonstrates that general nervous debility cannot be the cause of the

* Study of Medicine, by John Mason Good, M. D. 1829.

earlier symptoms. When a patient is first seized, a copious bleeding from the arm, and a large dose of laudanum, are the remedies chiefly to be depended upon, and these, if resorted to on the approach of the malady, will be generally successful in checking or moderating its progress.

It may be alleged, "the principle of this curative process is decidedly stimulant; the abstraction of blood, instead of depressing the powers of life, tends to strengthen them, breaking the chain of diseased action, and relieving the heart, already oppressed, of a portion of its circulating load; brandy, laudanum, and other narcotics," it may be continued, "are stimulants in the first instance, their narcotic influence being a secondary effect, and therefore they are often successful in counteracting debility in diseases, of which nervous prostration is, doubtless, the most prominent feature." In reply to these arguments, we can perceive no parallel existing between the treatment suited to a disease of strict nervous debility, such as typhous fever, and that of Spasmodic Cholera. In the cases of the former, where the putrid tendency is developed with the accession, to resort to blood-letting will diminish the chances of recovery to almost nothing. The copious and repeated administration also of narcotic medicines, that prove our sheet-anchor in withstanding the inroads of Cholera, would rapidly extinguish the flickering ray that sheds vitality in typhus.

That local excess of nervous energy is the cause of the symptoms, is supported by the pathology of Cholera. The localities in which this excess is generated, appear primarily to be the nerves connected with the liver, stomach and bowels. The nerves of the limbs, and of the other parts, subjected to spasm, are probably secondarily affected. The effects correspond to the cause. There is uneasiness at the pit of the stomach, and the patient's face wears the anxious and shrunk expression common to severe abdominal distempers. The canal, along which, in health, the bile freely travels to the intestines, is closed by the constriction of cramp. The spasms soon extend to the stomach and bowels, and they, in consequence, are compelled to evacuate their contents. The patient now complains, for the first time, of extreme exhaustion. This is worthy of special remark as corroborative of our views, that debility is an effect, and not the cause, of the earlier symptoms.

The character of the attendant spasms would not lead us to suspect a diminution of energy in the nerves distributed to the muscles affected. They are of the rigid kind. Is inordinate and continued action, then, the result of debility? Does deficiency of stimuli excite muscles of extraordinary contractility? Surely not. That the patient will be reduced to a state of helpless exhaustion, is no reason against entertaining the previous redundance of nervous influence. The concord of the animal functions, voluntary and involuntary, which characterizes health, is broken by the undue accumulation of energy in any one of the textures subservient to them. Nor do the instances in which Cholera proves almost instantaneously fatal, militate against our position. They only show that a stimulus, which in a com-

mon degree of activity excited undue action alone, will in a greater measure completely destroy it. Thus electricity, in graduated shocks, may recruit, or derange, or destroy the body. In the same way, cold, under ordinary circumstances, is a bracing stimulant, but in excess it is dangerous to life. Mr. Scott has recorded a curious case, which, in so far as the nerves of the extremities are concerned, bears hard upon the doctrine of debility. It is that of a man who had been subject to paralysis and total numbness of his limbs. In addition, he had the misfortune to be seized with Spasmodic Cholera, when, to the surprise of his attendants, his limbs became the seat of spasms, and also exquisitely sensible.

The possibility of effecting a cure in Spasmodic Cholera, greatly depends upon the time in which the patient is submitted to medical management. Should the disease be allowed to completely develope itself before advice is obtained, it will frequently baffle the exertions of the most skilful practitioner, and prove rapidly fatal. But if the physician be consulted when the symptoms are moderate, when uneasiness and anxiety are chiefly complained of, after the use of the customary remedies, strong hopes of recovery may be indulged. Blood-letting, and a large dose of calomel, should be immediately prescribed. To these should succeed constant frictions of hot flannel to the skin; internal prescriptions of laudanum, brandy, and water, and other sedative anti-spasmodics, to be used at such intervals of time, and in such quantities, as the physician may consider best fitted to the peculiarities and urgency of the case. The signs of returning health will be recognized in the reappearance of bile in the evacuations. The secretions of saliva and of urine, which had been suspended during the severity of the attack, will be again restored. The breath and skin will gradually recover their natural heat; and, in short, every function of the system will return to the salutary standard.

Should the patient delay application for advice until the disease has advanced considerably into the second stage, venesection will generally prove useless or injurious. The cramps are established, and they should be alleviated by friction, and the exhibition of anti-spasmodic medicines. If the third or last stage have set in, a discriminating judgment must also be exercised. As debility has now become our only opponent, the sedative preparations are to be modified accordingly, so as to produce little more than a stimulant effect; for the use, at this period, of laudanum, &c., in quantities suited to the treatment of spasms, would render the catastrophe inevitable.

Although we are unacquainted with the individual remote cause that imparted to Spasmodic Cholera the epidemic and fatal character which it assumed in the town of Jessore during 1817, it is clear that it must have depended upon one of the three following circumstances:—1st. Either some peculiarity in the condition of the atmosphere; 2d. Or some peculiarity in the condition of the human body; 3d. Or upon a peculiar condition of both. As the various writings upon the subject do not rise above speculation, we shall pass over them to inquire in what manner the disease is propagated in the present day;

whether it is communicated from one person to another by contagion? Or whether the atmosphere is the sole remote agent in exciting the distemper?

A few years ago Dr. Maclean divided the medical world into contagionists and non-contagionists. Our sentiments are decidedly opposed to those of Dr. Maclean; yet, notwithstanding, we suspect that the attention he received at the hands of the College of Physicians, was not commensurate to his abilities. The public, moreover, through sheer ignorance of the steps leading indirectly to the temple of science, whilst it swallows with avidity the monsters of quackery *practice*, is ever ready to raise an idle clamor against theories—medical theories in particular.

> To doubt the sun's a sea-coal fire,
> Would mightily displease
> Some folk, who think the whey-faced moon
> Is made of recent cheese.

"In the world of wisdom theories abound." Prosecuted by men of abilities, even false theories are often productive of much good. The hasty growth of the structure, lacking bone and muscle, either destroys itself, making men wiser by experience; or it demonstrates how far the theory, which has entered upon the right road, may be received. Dr. Maclean failed to prove the non-contagious nature of Egyptian plague, but the College of Physicians were obliged to admit that some modification, advantageous to the interests of commerce, might be made in the quarantine laws.

The fundamental error which governed Dr. Maclean, was an extravagant love of uniformity. He forgot that Nature, while she carefully preserves the family likeness, frequently leaves details to the "beauty of contrast." His first grand position* was, that fevers truly contagious could not affect the same person more than once in a natural life. Therefore, Egyptian plague and typhous fever were non-contagious. Secondly, that epidemics are not propagated by contagion, but depend upon atmospheric causes. Unmindful that he was himself the maker of these "laws," he called them fixed and unchangeable.

The distinction drawn between epidemic and contagious diseases, was altogether fanciful. The fact is, that contagious diseases may become epidemic; and epidemic diseases, originally dependent upon atmospheric causes, may become contagious. Scattered cases, for instance, the smallpox—a disease, the contagion of which is unquestioned—are constantly occurring in various parts of England; but occasionally it attacks great numbers of children, about the same time and place, or, in other words, it assumes the epidemic form. The contagious fever of measles is obedient to similar laws.

Contagious diseases are communicated from one person to another in two ways, either through the medium of contact, or by close exposure to exhalations emanating from a person infected. To avoid a

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* Dr. Maclean on Epidemic and Pestilential Diseases, 1817. Ditto on the Evils of Quarantine Laws, 1824.

war of words, these affections may be said to have an *animal origin*. Diseases, on the other hand, that spread, independent of contact or animal exhalations, may be said to have an *atmospheric origin*. The task of arranging these maladies under two distinct heads, in relation to their causes, appears to the uninitiated a work of extreme simplicity. But it is not so; for, as we stated above, they do not always retain the identical character that distinguished their first appearance. Several fevers vary in their cause. The same disease may at one time be referred to the atmospheric, at another to the animal origin.

Egyptian plague furnishes an example of the variable remote cause to which we allude. This disease prevails during the winter half of the year in Lower Egypt. It is highly contagious; but though communicated rapidly from individual to individual, by exposure to pestiferous contact or exhalation, there is sufficient evidence to show, that persons resident there may contract the disease without having undergone any such exposure, and that afterwards they may, by contagion, transmit it to others. Now, a physician who had witnessed a few of the spontaneous cases, if we may so call them, judging from his own limited experience, might ascribe every instance of the disease to an atmospheric origin exclusively; while another, who had only met with instances the result of contagion, might ascribe every case as exclusively, and with equal justice, to an animal origin. This view of the matter may diminish the astonishment with which the public behold the discrepancies of medical evidence.

The admission of a variable remote cause for some contagious diseases, is forced upon us at home in the history of typhous fever. It is commonly propagated by a specific contagion; yet certain external circumstances are sufficient of themselves to generate the disease in the human body. These are, damp houses, ill-ventilated, and crowded with inhabitants; wet winters, scarcity of food, and all the depressing concomitants of poverty. In this way have originated hospital, camp, and jail fevers, which are of a contagious nature, and may be collectively included under the appropriate name of *typhus*.

The digression upon the animal and the atmospheric origin of Egyptian plague and typhous fever, was introduced to prepare the reader for a few observations regarding the origin of Spasmodic Cholera. While the disease was restricted to Hindoostan and its neighborhood, the members of the medical profession in India endeavored to discover the medium through which it was propagated. A large majority, more particularly of the Bengal Presidency, declared the disease to be non-contagious. But in Bombay, the contrary conclusion was ably maintained. In justice to the early advocates of non-contagion, it should be observed that the question, at the period to which we refer, wore a somewhat different aspect from that which it assumed under the impression of later events. The progress of Cholera had then scarcely exceeded the boundaries of Hindoostan, and here the mild and malignant varieties were dangerous. The non-contagionists might, therefore, reasonably ask, "why a disease which began at Jessore, independent of contagion, should not likewise

be generated in other localities under the influence of atmospheric causes?" We believe that it was so generated in many instances, and upon the strength of this admission we would reconcile several apparently conflicting statements; the leading features, however, developed in the history of the malady, cannot be satisfactorily explained, in the absence of contagion, on any known accidental condition of health and of the atmosphere. These features are—

1st.—Epidemic Cholera* has travelled as often against, as with the course of the winds. In the very face of a strong S. W. wind which blew in that direction for some months, it passed from Bengal to the Deccan. It has prevailed in every kind of weather common to the climates affected. In the dryest weather, and during the deluge of periodical rains; in storms, and in calms; under the scorching sun of Arabia, and amid the snows of Russia.

Opposed as are these facts to the usual progress of maladies, the extension of which depend solely upon the atmosphere, the character of the succeeding, favors, in a still greater degree, the existence of a contagious power.

2nd.—Epidemic Cholera has in general rigidly followed the great highways of human intercourse. Pursuing the line of navigable waters, and the route of caravans, it entered or traversed the different countries. Through India it extended along the rivers Ganges, Hooghly, Jumna, and Nerbudda. Arabia, Persia, and Syria, were penetrated by the Persian Gulf, the Tigris, and the Euphrates. Moscow received the disease by the route of the Volga. China, other parts of Eastern Asia, and the various islands, were infected over sea, as appears from the Cholera making its earliest ravages in the port towns and maritime districts. Agreeing with the disposition of contagious diseases, the Cholera has been most virulent wherever human beings were numerous and concentrated. In densely-peopled cities; in armies encamped, or upon the march; in localities unfavorable to free ventilation,—as low sheltered grounds, narrow streets, close dirty houses. The slow rate of progression at which the epidemic advanced from place to place in succession, and the temporary halts which it occasionally made, perfectly agree with a contagious origin; but they cannot be reconciled to an atmospheric. It travels, on an average, at a rate varying between ten and eighteen miles a day. But often, in particular instances, much less. Within the Zillah of Nellore it proceeded thirty-two miles in twelve days; in the next twenty-seven days, eighty miles.

Writers who deny the contagious nature of Cholera, rest their belief chiefly upon the circumstance that many persons were attacked without having had previous intercourse with the sick. This objection brings but little weight with it. In Hindoostan such cases may have, at times, arisen from external causes, as at Jessore; but in other countries, where Spasmodic Cholera has never been known until the Indian invasion, we would refer them to contagion, for it is

* *Vide* the different Reports compiled by order of the East India Company; and also the publications of individuals upon the subject.

notorious that contagious exhalations may be carried about in merchandise, clothing, &c., their infecting energy remaining for a considerable period unimpaired.

The Russian government was of opinion that the Cholera, during 1829, had entered the province of Orenburg with the caravans trading between Orenburg and Boukhara, the commercial entrepot of Central Asia. The Russians, indeed, have uniformly treated the disease as if contagious. The medical council of Petersburgh issued quarantine orders, under which every patient was to be strictly prohibited from holding close intercourse with persons in health. Even the Emperor Nicholas, who to encourage the inhabitants, visited Moscow during the prevalence of the Cholera, underwent, before his return to Petersburgh, the usual ordeal of purification in quarantine. How far these precautions are productive of benefit, it is difficult to say. The disease was equally mortal in Russia as elsewhere, comparing the number of deaths with the number of the diseased; but it is a remarkable fact, that fewer of the people by far were attacked there than in southern countries. Whether this partial immunity resulted from the influence of climate, and the stronger constitutions of the Russians, or the rigid quarantine, or from a combination of these three circumstances, it is, perhaps, impossible at present to decide. In the island of Bourbon, however, where sanatory regulations were prescribed and enforced, the malady spread less extensively than in the neighboring island of Mauritius, in which these things were neglected. As the character of the inhabitants and of the climate is similar in both islands, this fact is in favor of the utility of quarantine; but the strongest evidence in support of contagion, and the propriety of enforcing quarantine, is, that the appearance of the disease in one country or district, has been generally shown to have soon succeeded to the arrival of persons from another, in which the epidemic had prevailed. In Persia, the gates of Ispahan were closed against the suspected caravan. It consequently passed through Yezd. Shortly afterwards the Cholera destroyed 7000 of the inhabitants of Yezd, while the former city escaped.

Cholera is capricious in the selection of its victims. The infirm and debilitated are its favorite subjects. Yet the best state of health will not ensure exemption. This is not opposed to our view of the proximate cause; debility renders the system more susceptible of morbid impressions,—be they sedative or be they stimulant. The black population suffers in a greater proportion than the white. It is calculated that four millions of the natives of India have been swept away by the scourge since 1817. A share of the mortality, however, may be fairly attributed to partial or total want, in a variety of instances, of medical assistance. In one district, the population of which is about 200,000 souls, the cases of Cholera amounted to 15,945; of these, 1,294 had been without medicine or medical aid, and there is reason to believe that of the number every individual perished. When proper medical means could be supplied at an early period, and their use continued, the result was gratifying to the friends of humanity; and creditable to the profession, if the intractable nature

of the malady be taken into account. The Madras army consisted of 83,336 men, European and native. During 1818, and the four succeeding years, there died 5 1-3 per cent of the whole force; or 23 3-4 per cent of those who had been attacked by the epidemic.

The laws of Cholera bear the impress of that presiding Intelligence who has described a circle, beyond which every species of physical evil must cease to mar the harmony of life. Were the disease to continue its ravages in the same place uninterruptedly for a series of years, it would depopulate the world. Few localities have suffered longer than four or six weeks at a time, under the worst form of the distemper, and to this succeed long intervals of safety more or less complete. It does not, moreover, promise to be a plague that will descend a miserable inheritance to many generations. Some countries, formerly afflicted, are even now returning thanks for permanent relief; and in most, the destroyer has relaxed its severity. Wherever it may next direct its course, the principal danger is to be apprehended. May its footsteps be averted from the dwellings of the poor in Great Britain and Ireland!*

2. *Several Cases of Spinal Irritation.* By David Wark, Surgeon, Dunlop.—The subject of spinal irritation, has, of late, attracted considerable attention, but so far as I have had an opportunity of judging of the opinions of practitioners, and from the paucity of writings on the subject, its occurrence would appear to be considered by the greater part of the profession, as but rare, and the violence of its symptoms by no means extreme. During the short term of little more than four years' practice, I have been led to a very different conclusion; with me it has occurred very often, and more than once with a violence to threaten dissolution. I am fully satisfied that were patients subjected to the proper mode of examination, there would be no lack of cases of spinal irritation. The disease being seated in one part, and the symptoms appearing in another, is probably the reason why it is so often overlooked, and of course maltreated. I am well aware that in the following cases there is nothing but what has been ably illustrated by Dr. Thomas Brown, and also by other writers. So impressed am I, however, with the importance of the subject, that were the perusal of them to arouse the attention of a single individual to this class of complaints, I would account them not written in vain. I propose merely to select a considerable list of cases, all of which occurred in females excepting the first.

*Case I.*—3d April, 1826. J. H. Weaver, aged 49, of shattered constitution. Complains of dull pain at breast, with incessant cough, almost preventing sleep, copious muco-purulent expectoration, dyspnœa, palpitation of heart, headache, and profuse nocturnal sweats; pulse 95, bowels confined. Has been ill four months, and

* To elucidate the subject of Cholera still farther, a chart of the principal towns and countries, traversed in its geographical progress, accompanies this paper in the Englishman's Magazine. We regret not being able to present it to our readers.

treated with blisters to the breast, and cough mixtures, without benefit. Dorsal vertebræ, about 6th, 7th, and 8th, are painful on pressure; pain stretching forward to breast, so acutely as to cause him to cry out. He had his bowels freely opened with purgative medicine, was confined to the horizontal position, and a blister was applied over pained part.

8th April. Blister, after several applications, discharges freely, but has produced a good deal of febrile excitement, which is subsiding.

12th. Blistered surfaces healed, and all the symptoms mitigated; pain in spine confined to one spot. The blister repeated and kept open about eight days, restored him to his usual good health.

This patient had been given up for consumption, and certainly he bore some marks of phthisis. It appeared, however, to be merely chronic bronchitis, combined with spinal irritation.

*Case II.*—22d June, 1828. H. B., aged 21, a woman of stout habit, has been subject to cough for several years; for eight or nine months has complained of pain in right side of chest, nearly constant, increased on inspiration and coughing; weight and oppression at breast, difficulty of breathing, dry convulsive cough, occasional headache, and dulness of spirits. Pulse 90, full, tongue moist, bowels natural, catamenia regular. Was bled to 12 ounces, and had a small blister applied to the breast with very little relief.

3d July. Symptoms worse. The third, fourth, and fifth dorsal vertebræ are tender on pressure, particularly on right side, pain stretching acutely forward, along the course of the intercostal nerves, to pained part inside of chest, causing dreadful convulsive coughing.

The horizontal position was strictly enjoined, and 12 leeches ordered to pained part of spine, which gave immediate relief; this was followed by a small blister, kept open for a few days.

10th July. Expresses herself greatly relieved, cough and other symptoms nearly gone—and three leeches more completed the cure. About a year and a half afterwards, this girl being attacked with smallpox, the same symptoms recurred, but subsided with the fever.

*Case III.*—5th June, 1829. Mrs. A., aged 33, mother of six children, of delicate constitution, complains of intense pain of right side of head, which appears a little swollen, dry cough, pain and oppression at breast, little increased on deep inspiration; respiration hurried and laborious, pain and numbness about shoulders, stretching down arms, palpitation of heart, great debility, is fatigued on the slightest exertion, or even speaking, pulse 112, weak and irritable, bowels costive. Upper dorsal and lower cervical vertebræ are painful on pressure, most severe about third and fourth dorsal; pressure aggravating symptoms. Had a child about three months ago, and did not recover well; three weeks afterwards, was affected with violent pain at breast, for which she was three times bled, and as often blistered, with but partial relief. Has consulted three medical men, who uniformly recommended blistering the breast. Is much reduced in body, and considered by herself and friends to be consumptive. Three days previous to seeing her, she had come fifty miles by land

and water for the benefit of sea air, and had caught a cold on her passage, to which she attributes the aggravation of her complaints. Day before this, had, of her own accord, applied 12 leeches to side of head without benefit. She had two blue pills at bedtime, followed in the morning by a full dose of salts and senna, which procured copious evacuations with abatement of headache and febrile symptoms. Was ordered 12 leeches to upper part of dorsal vertebræ, to be followed by a blister. As she lived a considerable distance from me, it was ten days before I again saw her. She was now so much better, that she was able to walk about, without fatigue; appetite and strength improving every day. Is still suckling her child; says she has not enjoyed such health since delivery, and describes her feelings after leeching as if something were awanting about her breast; blistered surface has discharged well, but is now healed. Pain in spine confined to between third and fourth dorsal vertebræ, and much easier. Nine leeches and a small blister about the size of a crown-piece, kept open about eight days, removed her whole train of symptoms. I saw her about four months afterwards, with slight return of same complaint, which was easily cured by the same treatment. In this case the horizontal position was only enjoined a few days at first. In some cases the horizontal position is a *sine qua non* in the treatment; in others it is by no means essential.

*Case IV.*—28th August, 1829. I was called to Mrs. B., aged 20, of delicate habit, who said that she was ashamed to see me, as she could not tell what she had to complain of only she felt weak, and her appetite was gone. Pulse 80, feeble, tongue moist, bowels natural, catamenia regular; stoops much, body reduced to a skeleton, so dull in spirits that she can scarcely be roused to the least exertion. On strict interrogation, admits having a slight feeling of weakness or weariness at breast. Upper dorsal vertebræ are tender on pressure, most about the fourth on left side; right quite free from pain, pressure aggravating symptoms at breast. About six weeks ago, after assisting the maids a short time at washing, her hands and forearms became covered with a florid eruption, which soon disappeared, and was succeeded by a slight cough and uneasiness about chest, which have since gradually worn away. Was treated with a solution of tart. antim., bark, and other tonics, but without effect. Six leeches were ordered to pained part of spine, which produced immediate relief. She was now sensible she had been laboring under more oppression at breast than she had been aware of. A small blister produced such constitutional derangement, and aggravated the symptoms so much, that I did not think of reapplying it. A few leeches were applied every second day for a while, making in all 31, which along with the horizontal position, greater part of the day, effected complete recovery. During the application of the leeches she uniformly felt herself getting better, symptoms returning a little before next application, which gradually wore off towards the end. In less than four weeks, her health and strength were completely restored.

*Case V.*—M. C., aged 23. In summer, 1826, I attended this girl in fever. She was advanced in the disease, and had been neglected be-

fore I saw her; was treated with local bleeding, blistering, emetics, purgatives, &c., as symptoms indicated. Her recovery was slow, and accompanied with a host of nervous and hysterical symptoms, which have continued more or less ever since. About two years ago the abdomen getting enormously distended, and communicating a doughy feel to the fingers, there was little reason to doubt that her bowels were loaded with feculent matter. A course of purgative medicine was ordered, which brought away a prodigious quantity of dark pitchy-looking fæces, mixed with mucus and slimy matter. The belly, however, continued nearly of the same size, but a little softer; the stools were less in quantity, but much the same in appearance. Her strength getting exhausted, and her faith having failed her, I was obliged to abandon the practice. About six months after this she complained of pain in right hypochondriac region, aggravated on pressure, with frequent attacks of bilious vomiting; upon questioning her, she admitted having pain about shoulders, particularly on right side. Several medical gentlemen saw her, and she was more than once blistered over the region of the liver, and salivated with mercury, to no purpose.

On the 18th Dec. 1829, I was again called to see her. She had been getting worse for some months, and is now confined to bed. Complains of pain and giddiness of head, pain and numbness about shoulders and arms, particularly right arm, dull pain over region of liver and abdomen, most acute about caput coli, occasionally stretching down thighs. Is much harassed with vomiting of acrid bile, eyes weak, speech has been hesitating for some months, is worse of late, stops often in the middle of words, abdomen reduced to natural size and feel, bowels open. Pulse 80, weak, menses have made their appearance all along, but a little irregularly. Says she is pretty easy while lying in the horizontal position, but all her symptoms are aggravated on getting up; gets so faintish in the erect position, that she is soon obliged to lie down. These symptoms led me to suspect the spine to be in fault. It was accordingly examined, and found tender throughout its whole extent; but particularly the cervical, lower dorsal, and middle of lumbar vertebræ. Pressure or the application of a sponge dipped in hot water, on the lumbar vertebræ, gave pain, aggravating pain in abdomen, and particularly at caput coli, pain shooting down thighs along the course of crural nerves. On pressing the inferior dorsal, pain stretches forward to right hypochondriac region, which she describes as distinctly the pain she has so long felt there; pressure on the inferior cervical produced a feeling of pain and numbness about shoulders, stretching down right arm, which has not had proper feeling for some months. But the most remarkable symptom of all, is in the upper cervical; slight pressure there increases the shooting pain above the head, and causes a feeling of constriction about the throat, increasing the impediment in speech, and causing difficulty of respiration. When the pressure is increased the pain becomes intolerable, the function of voice ceases, and the respiration is as completely stopped as if she were suspended by a rope round the neck. Whatever part of the spine was pressed on, pain was felt

shooting along the course of the nerves, but most severe on the right side. The upper cervical and inferior dorsal were the two points most severely affected, and from which I judged it not unlikely the pain might spread along the spine: these I resolved first to attack. Six leeches were applied to upper cervical, and same number to lower dorsal vertebræ. These were repeated with relief, and two small blisters were afterwards applied. In five days, when I again visited her, I found that the leeches had bled very freely, and had produced considerable debility; her face was pale and blanched, and she could with difficulty turn in bed. The blistered surfaces discharged for about a fortnight. It was a month before she gathered much strength; these symptoms, however, were mitigated, and she spoke more freely. By the middle of April she was able to be out of bed the greater part of the day, spoke without hesitation, and was nearly free from former symptoms, but dorsal vertebræ, between 9th and 10th, were still a little tender. By the middle of June she could take exercise out of doors, had a good appetite, and the spine was sound except between the 9th and 10th dorsal vertebræ, where there still was tenderness on pressure, shooting through to right side, in which she still felt some uneasiness. Considered herself in better health than at any time since attack of fever.

The horizontal position may have been a good adjunct here, but that it was essential to the cure does not appear, as she was obliged to keep it most of the time for near six weeks before the treatment commenced, notwithstanding which she became every day worse. That the origin of the nervous system was in fault since fever, I doubt not, and that timely detection and timely treatment might have saved her from nearly four years' suffering and misery, and preserved her constitution from a shock from which it can never fairly rally, I as little doubt. The pain in side and shoulders, and vomiting of acrid bile, were certainly symptoms of inflammation of the liver, but it is plain it was merely suffering in function, from disease of its nerves, as the heart and stomach are often known to do from the same cause.

*Case VI.*—A few weeks ago I was called to see a young woman 21 years of age, whose prominent symptom was vomiting of everything she took. She had pain in right hypochondriac region, increased on pressure, and pains about shoulders, shooting down right arm, which she describes as stitches. Had a child in the 16th year of her age, from which she dates the commencement of pain in side; pain in shoulders more recent, dyspepsia of some years' standing, but vomiting has only been distressing of late. Has been often bled and blistered for pain in side, (supposed to be hepatitis,) and sometimes with partial relief. Had consulted a medical practitioner a few days ago, who ordered a large blister to be applied over region of liver. Ninth and 10th dorsal, and 4th 5th and 6th cervical vertebræ, are painful on pressure, the pain stretching to pained part in side and shoulders. Nine leeches were immediately applied to 9th and 10th dorsal vertebræ, and in a few days same number to inferior cervical. Eight days after this she came a distance of about four miles, to show me how much improved she was. Vomiting gone, pain in shoulders and side

much better, lies in bed most easily on right side, which she has not been able to do since she had the child; pained parts in spine still a little tender. Leeches ordered to be reapplied. I saw her about a week ago, stout in body and looking well. Says that she enjoys excellent health, to which she has been a stranger for more than five years. The horizontal position was not observed in this case.

I have only met with one case of this kind, which defied remedial measures; the prominent symptom was tickling cough; time, however, effected the cure. Several cases have been relieved, although they could not be said to be cured. This disease sometimes accompanies consumption, yet in one case I had strong reasons to believe that it roused up fatal tubercular phthisis.

That this class of complaints is seldom seen, except in the debilitated walks of life, appears to be unfounded. Anything here, in place of a town, scarcely deserves the name of a village. My practice is entirely in the country, in a place, too, famous for the salubrity of its air, and the healthiness of its inhabitants; yet in such a place spinal irritation holds no inconsiderable rank in the catalogue of human calamities.

As a stimulus to the younger candidate for medical eminence, I may be allowed to mention, that in the diagnosis and treatment of no other disease I gained so much credit and confidence in families. I have cured several who have long been considered to be falling victims to consumption, the gaunt and unrelenting destroyer of mankind. Restored to the arms of their families and friends from a long period of hopeless sufferings, they often know not in what terms to express their gratitude.—*Glasgow Medical Journal.*

3. *Cases of Pulmonary Consumption, with Observations.* By Thomas Henderson, M. D., Professor of the Theory and Practice of Medicine in the Columbian College, D. C.—*Case I.*—The subject of this case is a young lady, whose mother died of pulmonary consumption. The patient is sixteen years of age. It has been observed that consumption preys not "on the thorns and brambles of this wilderness, but on the rose and passion-flower of human excellence and gentleness." This was exemplified in the case of this lady. Apprehensive from her fragile delicacy of constitution that she would have phthisis, and attracted by her meek, gentle disposition, and by her personal loveliness, her friends watched over her with a tenderness that sheltered her from every impression which could hazard either emotion of mind or irritation of body. She was nurtured with all the vigilance and care required by the loveliest and most tender flower. Pulmonary irritation, notwithstanding, became evident, and this but redoubled the sedulous attention of her friends. She kept her room, avoided exertion, had a long course of medical treatment. In her case there was no amelioration: it proceeded steadily to a fatal termination.

*Case II.*—Miss ——, sister to the lady whose case has just been given, was for many years threatened with consumption. She had a very flat chest, cough, expectoration, great debility, pain in the side

and breast, amenorrhœa, flour albus. She became much emaciated, and all who knew her were assured that the hereditary family disease would soon terminate her existence. Nothing that affectionate solicitude could procure was withheld. I attended her for a long time, endeavoring, while I guarded against inflammatory action in the lungs, to prevent the increase of debility. Particular attention was given to avoid active exercise or exposure to cold. Her health did not improve. Being sincerely pious, and desirous to practice what she professed, she insisted on attending evening prayer meetings, and on uniting with other institutions for benevolent purposes. These involved a change in her habits, *against which I remonstrated*, and in which she was opposed by her friends. She, however, gradually adopted her own course; took no medicine; went out at night, and exerted herself far beyond what was thought discreet. She improved in health; her mind became more cheerful; it was obvious that the change of habits had no unfavorable influence. The pulmonary symptoms declined. She married soon after, has children, and now enjoys good health, with every prospect of long life.

*Case III.*—Mr. ——, is the brother of the cases just related. He inherited a feeble, delicate frame, with striking resemblance to his mother, who died of phthisis. At eighteen he had a cough and pulmonary symptoms; but he entirely disregarded the monitions of hereditary predisposition, as actual symptoms of breast complaint, as well as what might be anticipated from a very narrow chest, tall and slender frame. He was engaged in laborious duties in a dry-goods store; afterwards pursued a life of much more active exercise, and exposure to all weather. He went two voyages to sea, and since follows mercantile business that requires bodily and mental activity. He preserved a good state of health for more than ten years. Of late he has had one attack of hæmoptysis; but except for the time has not confined himself, and is recovering well from it.

*Case IV.*—Miss ——, aged twenty, came under my care with many symptoms of tuberculous consumption, which disease had proved fatal to several members of her mother's family. My patient has hard cough, slight pain in the chest, expectoration of tough ash-colored mucus, great debility, pain in the loins, and there was an irritable, frequent pulse. I was exceedingly apprehensive of the result, and treated her case circumspectly in the way usually pursued by the best practitioners. She took digitalis cicuta; was moderately bled, was blistered, and all this without benefit. Seeing that no relief was afforded by medicine, and that the prescribed cautions as to exposure and exertion, denied her many of the enjoyments that a fine mind and cheerful spirit derived from social intercourse in visiting her friends, she gradually ceased consulting me, adopted her usual habits, and lost no health by giving up medicine. She travelled, married some time after, is the mother of several children, has pursued a very active life, and has no reason to apprehend a return of her symptoms.

The four persons whose cases have been detailed, were near relations. The first case submitted most rigidly to what was medically

advised; she was closely housed, took much medicine, and yet the symptoms were not palliated, nor the fatal result procrastinated. In the other instances, strong predisposition to consumption; nay, actual symptoms were averted and removed by a course utterly at variance with what the physician advised. I do not mean to say that the same course would have removed the disease in the first case, for there are too many cases inevitably mortal. It is sufficient that the result of the three favorable cases be borne in mind in reading the observations at the close of this paper.

*Case V.*—Dr. B——, while a student of medicine, attracted my attention. His family had been severely visited with tuberculous phthisis. Within a year two brothers and one sister died of it. He had pulmonary symptoms, pain in the breast, cough; once spit blood, and his friends deeply feared that he would fall a victim to consumption. His brothers and sister were attended carefully by an eminent physician, who pursued the routine thought best for such cases; he adapted that routine with great intelligence to the several cases. I was consulted in two of the cases; no benefit resulted from medical treatment. Dr. B—— was so situated as to be compelled to walk two miles every day to attend the medical lectures, and to return the same distance at evening. This he did with unvarying regularity, through all kinds of weather, and frequently remained in the dissecting room till late at night. Such was his ardor for the acquisition of medical knowledge, that though with the above symptoms and much debility, he exposed himself to weather cold and wet, and to fatigue that others shunned. Occasionally the pain in the chest and debility were alarming—but he took no notice of them, and continued habits that *I urged him to avoid.* He, thus predisposed, continued these habits for three winters, and now lives in finer health than he has ever enjoyed. His relations who died, carefully shunned exposure and exertion.

*Case VI.*—Some years since I was called to see a gentleman, about twenty-two years of age. His father died of tracheal and tuberculous phthisis, and my patient had for some time labored under cough, purulent expectoration, hoarseness, pain in the breast. He had fever, with partial night sweats. I could not doubt, from his symptoms and the attendant emaciation, that his disease was confirmed strumous consumption, and that it would soon terminate fatally. I prescribed various remedies, anti-hectics, mild tonics, bleeding twice for the pain, mucilaginous mixtures for the cough, blisters, &c. As the autumn approached, I endeavored to impress on his mind my views of what should be his winter arrangements; these views were founded on flannel and the fireside; particularly that he should avoid exposure to cold and wet weather. He promised obedience to my advice as to the use of medicine and exposure during the cold season. I paid great attention to his case and symptoms, but the treatment did him no good. As his duties required exposure, he finally became impatient; went out as I thought at great hazard; abandoned the use of medicine, and as he rapidly lost flesh, it seemed almost certain that he would not live long. I discontinued my visits, as he took

nothing, and was imprudent. He would walk for miles in the coldest weather without a surtout, and without flannel. He never avoided wet walking, or exposure to rain or snow. He took what diet was most agreeable to him; and now after four years' continuation of these habits, he is in much better health. The pulmonary symptoms are comparatively slight, and he apprehends no bad consequences from them.

*Case VII.*—About two years since, at the close of winter, I was consulted by a gentleman who had pulmonary symptoms. He had cough, expectoration, pain in his breast, lost his flesh, his constitution was delicate, his frame slender, and his chest narrow and stooping. I blistered him, gave him cough mixtures, and confined him to his room until the weather became mild. As he did not recover, I advised him to go by sea to New York, to reside in the country, to take exercise freely, and to avoid medicine, unless it became obviously necessary. I had the pleasure to see my patient some time after, with his symptoms entirely removed. Medicine had no agency in his recovery.

*Case VIII.*—Mr. ——, aged fourteen, lost his mother with tuberculous phthisis. It deserves remark here, that his mother was one of a family of nine, every member of which family died of this phthisis. This youth was growing up with every appearance of the scrofulous aspect; strong symptoms of pulmonary disease came on; as cough, thoracic pain, and I am informed that he once had hæmoptysis. He was advised to adopt the life of a sailor, the laborious duties of a common sailor. He went out before the mast, and after having been two years at sea, seems to have a renovated constitution, and is free from the pulmonary symptoms that threatened his life.

*Case IX.*—Mr. J——, lost his mother with tuberculous consumption. Seven years ago he had measles, which, as they declined, developed pulmonary symptoms, cough, pain in the chest, expectoration of tough dark mucus. Ever since he has suffered with obvious symptoms of tuberculous consumption: during the winter they are distressing.

He has taken no medicine, is bled when the lungs seem to be irritated, and when they occasion pain—and has derived great benefit from issues. But he has pursued a regular plan of out-door exercise on horseback and in walking, in winter and in summer. He is now better than when first taken. He attends the medical lectures; dissects at late hours, and is confident that his habits have baffled the threatened inroads of a most formidable disease. He does not lose blood habitually—only when obvious local plethora demands it.

I have been induced to review my experience in the treatment of phthisis pulmonalis, by reading two papers by Dr. Parrish, in the North American Medical and Surgical Journal. I could have adduced several other instances, but the above cases appear to me sufficient to justify some very interesting practical reflections. These may be submitted in the form of queries.

1. What has been the result in those cases of tuberculous phthisis which have been subjected to deliberate and judicious medical treatment, *unconnected with free exercise in the open air at all seasons?*

The answer is, that my long and extensive experience does not afford one case of recovery.

2. Has the medical treatment, *without active exercise*, materially protracted life in any cases?

The answer is, that it is very doubtful whether one life has been materially protracted.

3. Have bleeding, digitalis, mercury, prussic acid, tartar emetic, confinement to stove rooms, blistering, emetics, cicuta, ipecacuanha, inhalations, liverwort, have any of these, *without active exercise*, arrested, averted, or cured one case?

Confining this answer to tuberculous phthisis and to my own experience, the answer is in the negative.

4. Has any one case been averted, arrested, or cured, the successful result in which has not been owing to exercise, exertion, to free exposure to weather at all seasons, in walking, riding, and sailing?

The answer is, that this course of habits seems to have been the only preventive or curative agent.

5. And yet another question recurs, viz., in reviewing my practice, is there not reason to believe that many remedies so much relied on, and so authoritatively commended, have been either positively or negatively injurious, if not both?

The answer to this question may be inferred from what follows. The subject should be cautiously investigated, but requires most serious consideration.

If the opinions and experience of Dr. Parrish and others, and if the cases just detailed prove anything, they demonstrate this, that many cases of phthisis that were in progress of medical treatment, and were doing badly, on discontinuing the medicine, and in relying on active exercise and plain nutritious diet, did well. It would appear that a continuation of medical treatment in other cases did no good; the disease terminating certainly, and often speedily in death. This was probably owing to the intractable nature of the disease preying on constitutions unable to withstand its ravages.

We should, however, inquire and reflect seriously, whether remedies, such as are used in consumption, if they be not beneficial, be not injurious. It is not probable that bleeding, mercury, digitalis, prussic acid, &c., will be negative in such a disease, and in such constitutions as the phthisical have. So uniform is their failure to cure, and so frequently are they injurious, that the routine of prescription is formal at best, and hazardous in many instances. This formality, this routinism, is the bane of improvement in our science; and Dr. Parrish deserves the thanks of the profession for the firmness and intelligence with which he has assailed it.

If it excite surprise when I say that not one recovery from phthisis has occurred in my experience, let it be observed that illusion is made to *tuberculous* consumption. Chronic bronchitis, catarrhal phthisis, and that from ordinary suppuration or abscess in the lungs, are not in view. I have often seen recoveries in these cases, and have reasonably ascribed the recovery to medical treatment. Not so with tubercular phthisis. In this fell disease, if a remedy there be, it is yet to

be discovered; and he is a wise practitioner who avoids the lædentia in scrofulous consumption. This form of phthisis is equally fatal wherever it exists; and where is it not? If in the admission that the remedies used may have been positively injurious, there appear too much candor, it is replied, I have followed the best lights that have been supposed to gleam along the dark path of tuberculous phthisis.

Experience has long since taught me that the writings of Dr. Rush on pulmonary consumption are not so much to be relied on as his precepts and practice in many other cases. The peculiar action of tubercular disease in the lungs, arising as it does from strumous complication, sets at nought the simplifications of ingenious hypothesis, and much more the boldness of systematic practice. Consumption consists in something more than the action of chronic pneumony, and invariably baffles the depletory measures directed to reduce that action. The origin, increase, and softening of tubercles, involve more in practical consideration, than the mere question whether or not they are the result of inflammation. It is in the incipient stage of tuberculous phthisis, that the practice of Rush is to be deprecated. It is to this incipient stage that the plan revived by Dr. Parrish is applicable, though not a few cases are on record in which the plan was advantageously pursued in more advanced stages. One of my patients appeared to be in confirmed consumption, and yet has been apparently preserved by this hardening system.

There is one thing to be considered in the treatment of consumption, and it is very important. Take a patient threatened with this disease, or with it formed; confine him to his room; deny him active exertion; bleed him frequently; put him on low diet; prevent unreserved intercourse with his friends; give him mercury, digitalis, cicuta, hydrocianic acid, and you surround him with a gloom that has most positive influence on his nervous system. Nervous depression and irritation, derange, irritate, enfeeble vascular action, especially in the capillaries, and here is a superadded and exceedingly operative difficulty. It is vain to talk to patients about exercise with dumb bells, &c., in stove rooms. Patients lose their energy by the confinement, and many lose entirely their elasticity and hope, in the fear that this course of practice and seclusion arises from the belief that consumption is formed, and therefore incurable. In all chronic cases, mental energy and cheerfulness are conspicuously subsidiary in treatment; without them, our mercury, and foxglove, and bleeding, do harm rather than good. This system, then, of confinement, so impairs nervous energy, as to act unpropitiously on the bodily powers, on the capillary circulation in the abdomen, on the skin, and above all, in the lungs themselves, favoring obstructions and sluggish circulation there. I have heard a delicate female say, with great firmness, "if I have to live but two years, let me rather enjoy myself than be immured;" and, pursuing her own course, she lives and does well.

How different are the effects of accustomed exercise and habits on the nervous system, and by consequence, on general functional action. How exercise tends to equalize and invigorate capillary circulation, and thus to prevent local obstruction, and if used with judgment, to

remove it when formed. Exposure to cold is supposed, in phthisical and other cases, to act unfavorably in two ways; on the skin generally by constricting it, exciting sympathetically the *irritatio introversa;* and secondly by direct impression on the air-cells of the lungs. The first mode of operation can be easily guarded against, by carefully adapting dress; while the injury from direct contact of air has always appeared to me to be hypothetical. Doubtless if a person habituated to stove rooms too suddenly inhales a cold atmosphere, it may be prejudicial; but this sudden change is not here considered or desired. An objection to exercise, is by some said to be, that it so hurries the circulation of blood through the lungs as to be prejudicial in tuberculous phthisis. Of this I have strong doubt. Too great exertion may do so; but this is not what we want the patient to make. On the contrary, moderate exercise regularly pursued on horseback or in a carriage, has, to my knowledge, reduced an irritable and frequent pulse in disease of the heart, to moderate and healthy action. I am sure that so far as exercise favors capillary circulation, it accomplishes an important object in the incipient, or even in the more advanced stages of phthisis.

It has been observed by Dr. Parrish, that the practice sanctioned by his cases and mine is not new. It is a practice which should be judiciously attempted and fairly tried by cautious perseverance. Let the patient keep the feet dry and warm; let him be so well clothed as to prevent sensations of chilliness; let him avoid those severities of weather that a man in health would shun; but after this let him take exercise in the open air, at first in the mode of gestation, then on horseback, and finally by walking. In winter let him go to a climate where there will be the least interruption to his active habits. In this case physic may be needed to remove painful incidental symptoms, and what this physic should be will be obvious. It may be that these habits, and the courses of remedies usually adopted, have been too much separated under the idea of their incompatibility.

In coming to the conclusions apparently justified by the above experience and reflections, and sanctioned by the excellent judgment of Dr. Parrish, I have had much to contend with. A physician should cautiously abandon practice sanctioned by authority, and should circumspectly enter on the field of experiment. Early education led me to rely much on medicine in phthisis. Facts, however, within my own experience, too numerous to be resisted, and too plain to be mistaken, have caused me much anxious consideration. These facts are submitted, as they may be useful. If duly estimated I think they will not be considered as overrated. We know much of the *pathology* of tuberculous phthisis, perhaps as much as we can expect to know. Bayle, Portal, Young, Read, Duncan, Southey, Rush, with many others, have illustrated every point within the range of consumption, *except the cure.* I have seen too many fatal cases, fatal after every effort that authority or reason sanctioned, to believe that we know any remedy that promises the least hope to the sufferer. What, then, shall the physician do who has thus been baffled in hundreds of cases? Let him listen to the candid intelligence and experienced judgment of Dr.

Parrish: let him test the practice, and confirm or confute the suggestion. Hippocrates sent his patients on foot to the walls of Megara—Sydenham sent one on a long journey to see a Doctor Robinson. In rhetorical figure and in laudable hope, the physician has said, that in the wilds of the unexplored west, at the base of the Rocky Mountains, the plant may grow, the flower may bloom, the root may penetrate that possesses the healing power over tuberculous consumption. If the views to be inferred from these imperfect remarks be correct, we may send our phthisical patients in pursuit of the expected blessing.—*Amer. Jour. of Med. Sciences.*

4. *Intermittent Hemiplegia.*—Dr. Elliotson has put on record, in one of his clinical lectures, a case of this kind, which is the first he has ever witnessed. Our readers are aware that we have recorded several cases of this description on our pages. We insert the present case for several reasons.

"There was a case of disease of the nervous system presented of a curious character, the first of the kind I ever met with—intermittent palsy. I have read of it in authors, and you will find it mentioned by Cullen as *paralysis intermittens.* Now among all the patients I have ever seen, and these amounted to between thirty and forty thousand, including those in various public establishments and private practice, I had never met with an instance of this description. It was a case of intermittent hemiplegia. The man was admitted into Jacob's Ward some time ago, and I mentioned his admission at the time. I gave him no medicine, because I was desirous of seeing whether his account was true or not. I seldom give medicine in aguish or intermittent complaints, till some one in the hospital has witnessed the occurrence of the paroxysms. He staid here three weeks without having a paroxysm. He was, however, a very respectable man, and I did not doubt his account. He then went out of the hospital, enjoined by me to return if his disease reappeared. One day when I came to the hospital some time afterwards, I found him in the courts, and he said he had been seized with a paroxysm that morning, and he actually was then in a state of hemiplegia of the left side. I saw it myself. I made him walk, and he dragged his leg in a semi-circular way, as patients usually do, when they are laboring under hemiplegia, and he could not raise his left arm. It began at ten o'clock, and this was the usual course of the disease. He had told me originally that the paroxysms came on at 10 o'clock in the morning, not every day, but every third or fourth day, and, with a single exception, never after a longer period than that; but, on one occasion, there was an interval of sixteen days. He was 48 years of age, and had been subject to this affection for two years and a half; and the paroxysm would last from three to four hours. But although it only lasted that time, he was not perfectly clear from it through the whole of the day. He never knew the paroxysms begin later than 11 o'clock, or earlier than 10; from 10 to 11 was the regular period till a week before he had been admitted, when one attack came on at half past ten in the evening—the usual hour, but in the evening instead of the morning.

The affection was not more frequent then than when it first began. The man looked sickly as if he had had ague, but still more as if he had suffered from a hot climate; and it appeared that he had been in the East and West Indies, and that he had had fever both at Bombay and Batavia. He had suffered from dysentary, and when he was in the hospital he had diarrhœa. I do not doubt that this was the effect of malaria—that his hemiplegia was a form of ague. I will not quarrel about words,—you might say it was not ague, because unattended with shivering, fever, or sweating; but I have no doubt it was as much the effect of malaria as ague is: it was merely a variety of the same affection of the system. Supposing this to be the case, and having witnessed a paroxysm myself, I now gave him the sulphate of quinine, and, as the disease was of long standing, I began with a good quantity,—five grains every six hours: this medicine very soon put a stop to the complaint, but not until I had increased the dose to ten grains every six hours, so that he took forty grains in the twenty-four hours. This is the dose that is often required in quartan ague, and the present was a worse form of the disease than the quartan, because it occurred on the third or fourth day; and the longer the attacks, the greater is the difficulty of curing the affection, which may be considered as so much the more of a chronic character. It is not a matter of wonder that that large quantity was required. He continued in the hospital from his first admission, on the 13th of October, till the 23d of December,—rather more than three months,—without any other attack whatever, and his health became greatly improved. It is wrong to suppose that malaria does nothing more than produce these particular forms of intermittent disease; it poisons the whole body, and many persons are destroyed by it who never had ague at all, so deadly is the poison. His health, however, regularly improved under the quinine; he became strong, his countenance was better, and altogether he found that he had received very great benefit. However, on the 28th of the same month, five days after his presentation, he came to me, saying that he had had a slight attack a very slight one, that morning, but still it was an attack, and it occurred rather later than usual, some little time after 11 o'clock. When I saw him, at about half-past one o'clock, it was then nearly gone off. I increased the quantity of sulphate of quinine to fifteen grains every six hours, and if that be not sufficient I shall give him more, as he is to come to me from time to time. I had a person in the hospital who was not cured of ague with less than a scruple every six hours, and therefore I shall not be surprised if that quantity be required in the case of this man; but I have no doubt that eventually he will be perfectly cured, though he may need very large doses.

"This is a very interesting case, proving that paralysis is not *necessarily* an *organic* affection; that hemiplegia does not necessarily arise from effusion, or from compression of any kind, at least of an organic nature. If any compression do occur in this man, it can only be during the fit, for at other times he is perfectly well; it is entirely, I presume, an affair of *function*, induced by a particular poison. I

have at this moment, in private practice, a very curious case, in which disease has arisen from malaria: it has occurred in a young gentleman about eleven years of age, who lives by the side of the Thames. He had diarrhœa at school, which was allowed to run on; he was, however, taken home, and treated very properly by the gentleman who attended the family, by leeches to the abdomen, and I believe a blister, and all went on very well. He had tenderness just on one side of the umbilicus; he was, however, seized, all at once, at a certain hour in the evening, with violent irritation, severe itching, tingling, and redness at the leech-bites, some feverishness, just at the very part where all the leeches had been applied, and every leech-bite became red and swollen. His sufferings were extreme, but, after lasting for a certain time, all these symptoms went away. At the same hour the following evening, the same thing occurred, the leech-bites became swelled and hot, and he fell into a state of general excitement, from, as it would appear, the itching and tingling. The medical gentleman immediately saw him, and thought the attack was of an aguish character; and, as the family lived in a low spot by the side of the Thames, he gave this lad twenty grains of sulphate of quinine, in divided doses, before the time of the next expected paroxysm. The attack came on the next evening, but at a later period than usual, showing that the remedy had produced an impression. It is common for the remedy not to stop the disease at once, but to cause the fits to be postponed. I, however, was sent for, and I told the family that I was quite satisfied that the youth was going on right; that the quinine was the only remedy, and that it must be persevered in at the same doses. The fits were very distressing—indeed, to the family, alarming, and we both agreed that it was better to go on with twenty grains in the twenty-four hours. The next day the paroxysm appeared later and more slightly, and then came on once in two or three days, and still more slightly; he presently became perfectly well. At the end of a month he went out of doors, and was exposed to cold, and from his extreme anxiety to regain the time he had lost from school, for he was a fine boy, a paroxysm came on again, but rather mildly; the medicine was again had recourse to, and the immediate effect was a postponement and alleviation of the next paroxysm, and I have no doubt that if he continue to take the remedy for some weeks, he will not have a relapse. These remedies will not cure the disease unless you give them for some time after the disease has appeared to cease. Sometimes it is necessary to give them for many weeks; sometimes it is necessary to do more than this—to remove the patient from the spot. Just as in syphilis, if a person get cured, and return to the same quarters, the mercury he has taken will, of course, not prevent him from again catching the disease; so a person may be cured of ague, but if he continue to live in the same unhealthy quarters, of course the poison may operate afresh upon him: and as, in syphilis, mercury must be taken for some time after all the symptoms have disappeared, so must quinine *after* ague."

We have seen many cases where paralysis was evidently not the

effect of organic disease, but of malaria. One, which we are not at liberty to mention by name, but which we lately saw with Dr. Paris, (who will confirm the truth of this statement,) is still more remarkable than the case recorded by Dr. Elliotson. A young gentleman, the son of one of the most PUBLIC CHARACTERS in England, travelled, more enthusiastically than wisely, through Italy, during the summer of 1830. The consequence was, a malaria fever, after which he lost the power of *all* the voluntary muscles of the body, from head to foot! In this deplorable condition, he was conveyed from Venice to London, *like a corpse in perfect health.* All the functions went on regularly—intellectual and organic—but all animal power of motion and locomotion was lost. This general paralysis continued for some weeks after his arrival here; and Dr. Paris very judiciously abstained from violent remedies, such as strychnine, &c., trusting to the recuperative powers of Nature. Motion gradually returned—first in the upper, and afterwards in the lower extremities—and we believe he is now walking about, and enjoying good health. Such accidents, though seldom on so remarkable a scale, are every year happening in Italy and other malarious countries, though they are very imperfectly known to the profession of Great Britain.—*Medico-Chirurgical Review.*

5. *Fatuity from an accumulation of Ascarides.*—Elizabeth Whittingham, a girl of 14 years of age, of a pale, gloomy, and vacant countenance, whose employments were sedentary, and who had never properly menstruated, was admitted an out-patient of the Bath United Hospital, Tuesday, October 28, 1828.

Her appearance and manner gave the strongest impression of idiocy, or rather mania. The brow was contracted; the eyes restless, wandering, and betraying suspicion; and she made repeated attempts to escape from the room. She refused to answer, or did not comprehend the commonest questions, and betrayed the utmost reluctance to a protracted investigation. From the information of her mother, who accompanied her, it appeared that she suffered chiefly from drowsiness, pain of head, vertigo, syncope, and hiccup; that she had more than once fallen down, and was totally indifferent to everything, and every person around her; her abdomen was large and tense; she had flatus, borborygmi, and costive bowels; the pulse was quick and sharp; and the tongue slightly furred.

To be bled immediately to 10 ounces. To have a three-grain calomel-pill every other night, and a purgative draught every other morning.

31st.—Less drowsy and oppressed, but "memory entirely lost, calling one thing for another;" is freely purged, motions less dark, and has discharged a vast quantity of ascarides, collected and agglutinated into round masses; countenance and manner little altered.

Increase the dose of calomel to five grains every other night, and continue the cathartic mixture.

Nov. 4th.—Countenance dark and suspicious, but speaks rationally; the stools are more healthy, and fewer masses discharged.

Continue the medicine.

7th.—Countenance bright and cheerful, evacuations natural, expresses herself thankful for the attention shown her, and is free from complaint.

1829.—This girl, when last heard of, remained in good health, and actively employed in her usual business, that of a seamstress. Her case, is recorded, not on account of anything very remarkable being attached to it, but as capable, perhaps, of affording a hint as to prognosis. Her demeanor was so eccentric, and her whole appearance so decidedly maniacal, that it might, in some instances, have led to severe and improper measures of treatment or of coertion, and the unfortunate sufferer, it is possible, have been actually driven into that state, which was, at present, only simulated.

Nothing certainly could be more remarkable, or present a greater contrast, than the face of gloom in the commencement, and the cheerful and pleasing demeanor at the termination.—*Med. Gaz.*

6. *Mode of arresting Hemorrhage from Extraction of the Teeth.*—A very severe and dangerous hemorrhage occasionally follows the extraction of a tooth. That this is, in some cases, the result of a hemorrhagic tendency in the constitution—in other words, of a want of contractile power in the coats of the arteries, seems clear, from the circumstance that some persons never have a tooth extracted, without considerable hemorrhage continuing for a long time afterwards. Several cases are on record which have terminated fatally, notwithstanding every effort which was made to stop the flow of blood. The usual mode of treating these cases, is to roll up a small bit of lint in a conical form, and to press it into the bleeding alveolar cavity, and then to produce pressure by a compress placed over it. These plugs are often imbued with styptics of various kinds, and caustic is occasionally introduced into the alveolar cavity. Failing these remedies, the actual cautery has been repeatedly used, and even the carotid artery tied, without effect.

When it is recollected that the bleeding vessel is situated at the very bottom of the alveolar cavity, it is astonishing that the simple method of applying pressure in immediate contact with it, which I am about to recommend, should not long ago have been adopted. The plugs of lint which are usually employed, are so clumsy and thick that they cannot be forced half way down the socket; and even if they are made more nearly to fit the cavity, the pressure which can be made upon them is very imperfect and uncertain. I have seen many very severe cases, and some in which the patient had very nearly sunk from loss of blood; but I never saw one in which I failed to stop the hemorrhage by the following simple process.

The bleeding alveolus is first of all to be ascertained, the coagulum carefully removed from it, and the interior cleaned by a piece of lint, and by rinsing the mouth with warm water. A strip of lint of sufficient length being torn off, one extremity of it is then to be introduced by means of any curved instrument which will reach the bot-

tom of the socket, and pressed down to the very extremity of the alveolar cavity; a further portion is then to be forced upon the first, and so on until the cavity is filled, and every part firmly consolidated, by each portion being pressed upon by the next above it: when the cavity is thus filled, and the lint rises rather above the edge, a compress is laid upon it, so thick as to be pressed upon by the antagonist teeth. The mouth is then to be forcibly closed, so as to retain the plug in its place, and keep it constantly and very firmly pressed against the bottom of the alveolar cavity.—*Thomas Bell on the Teeth.*

7. *Lithotrity in Asia.*—Dr. Civiale communicated to the Academy of Sciences of Paris, a letter addressed to the Minister of Foreign Affairs, by the French Agent in Bagdad, announcing the performance in the latter city of the operation of lithotrity on twelve persons, by a German Surgeon named Martin, and all of whom were perfectly cured, except a child who was obliged to be cut in consequence of the great size of the stone.—*Gaz. Medicale.*

8. *Case in which a large Spoon was swallowed, and produced Ulceration of the Duodenum and fatal Peritonitis*—By Mr. Houston.—The body of a maniac who died with symptoms of *peritonitis*, in the Richmond Lunatic Asylum, was brought to the College of Surgeons for dissection. The peritoneum exhibited all the marks of violent inflammation, viz., copious effusion of lymph, and sero-purulent fluid, with extensive adhesions. A small quantity of the contents of the duodenum was found out of the bowel in the left hypochondre, and a large rusty iron spoon, eleven inches long, was found lying across the bowel, with the handle directed foremost and downward, where it had produced ulceration and perforation of the bowel, while the larger end was lodged in the pylorus, which, though dilated, was neither ulcerated nor broken. The spoon was bent in the centre, where it rested on the vertebræ; but whether it had this form previous to being swallowed, or had acquired it afterwards, it was impossible to ascertain. From the position of the spoon, Mr. Houston infers that it had not been swallowed accidentally in the transmission of food, but had been forced down the œsophagus by the insane patient.—*Ed. Med. and Surg. Journ.*

9. *The Human Voice.*—At a late sitting of the Paris Academy of Sciences, some interesting facts were disclosed in a paper by M. Bennati, on the Mechanism of the Voice. From his professional engagement of physician to the Italian Opera, he has had extensive opportunities of forwarding the object of his inquiries. He has observed that the voice is chiefly affected by the elongation of the uvula, which most persons who have had severe colds will readily understand; in some cases, that part of the human organ becomes so enlarged as to entirely prevent the issue of any sound louder than a whisper. The case of a lady was instanced, who entirely lost the use of her voice for several months, and was reduced to the necessity of writing all she wished to say; recourse was had in vain to several

eminent physicians: she at last was advised to use *a gargle of strong alum water*, which COMPLETELY RESTORED HER VOICE. A permanent organic enlargement is not unfrequent, in which case M. Bennati has successfully employed cauterization of the uvula, and has, in some cases, increased the *timbre*, and even added two or three notes to the compass of the voice. Those who wish to benefit by such a curious discovery, will be glad to know how this is effected. He makes use of a metallic instrument, at the end of which is a bowl containing the lunar caustic, so shaped as to touch, simultaneously, the whole surface of the uvula, having a sliding lid to prevent contact with any other part, which is acted on through the handle of the instrument. The effect of the caustic is to excite the contraction of the muscles, and reduce the part to its ordinary dimensions. A few applications will prove its efficacy. An instance is cited, that of a pleader, who, after speaking a short time, lost the tone of his voice, his throat became dry, and convulsive coughing ensued; and he was obliged to relinquish pleading. Having consulted M. Bennati, it was discovered that the uvula was considerably elongated. He employed the caustic, and in nine applications his voice was completely restored, and he is now a distinguished advocate.—*London Athenæum.*

10. *Case of Poison by Rattlesnake.*—By Dr. Hiram B. Philips, of Buncombe County, North Carolina.—As I conceive that a record of cases is of the first importance to the science of medicine, I hesitate not in placing the following paper before the medical public. No originality is laid claim to; my sole object consists in corroborating the practice recommended by Mr. Ireland, by showing the beneficial use of arsenic against the poison of the rattlesnake. Without any further comment, I shall proceed to relate the case.

On the 25th of July, 1830, at 8 o'clock A. M., I was called to visit Miss Happy Briggs, who had been bitten twenty-six hours before by a rattlesnake. She had received two wouuds; one on the instep, and the other near the great toe of the left foot. Her body was considerably swollen; her eyes almost closed; tongue tumid; deglutition impeded to some degree, and articulation indistinct. Her left leg, as high as the hip, was enormously distended, and threatened mortification; the skin having a shining appearance, with discoloration, being black on the outside and mottled on the inside with black and yellow spots, so that one might have fancied it resembled the skin of the snake. The bitten part pains her severely; and the inguinal glands on that side were much enlarged; pulse low, and about 60 strokes in a minute, and surface cold. She felt extreme nausea, and vomited on making the least exertion. Great thirst was an attendant symptom from the first, so much so, that previous to my arrival she had allayed it with an immoderate quantity of water; her bowels were rather constipated. Her mind appeared not in the least affected.

I commenced my treatment by making longitudinal incisions from the left knee downwards to the feet, and scarifying the wounds, and then blistered the limb extensively. She took the volatile alkali in f. dr. ii. doses at intervals for two hours without any good effect. Find-

ing the circumstances thus, I determined to have resort to arsenic, and Fowler's solution not being procurable at the moment, I employed the oxide, commencing in doses of a quarter of a grain every fifteen minutes, for about two hours, when I perceived a material alteration in my patient; the swelling diminished somewhat, the nausea ceased, and she was able to articulate distinctly. By continuing the treatment with the arsenic for two hours more, all dangerous symptoms disappeared. All her body except the left leg, (which, however, was lessened,) was completely unswollen. Towards night she complained of head-ache, and her pulse rose to about 130, strong, full, and hard, when I judged venesection expedient, and extracted ten ounces of blood, which relieved her. I prescribed then the oleum ricini to obviate constipation, and effected the intention. After leaving the blisters twenty-two hours on the limb, they were removed, and the sacks formed by the cuticle, contained from a pint and a half to a quart of liquid, of a dark greenish colour. The blistered surfaces were dressed in the usual way, and in three weeks my patient, by taking a gentle purgative every third day, was restored to her former health and vigour.

I have thus endeavoured to sketch a case which, from the small number of similar kinds on record, I trust will not be unserviceable.

11. *Medico-Legal Examinations of two cases of sudden death from wounds.*—By Mr. Alexander Watson.—We have already made liberal extracts from the July No. of our valued Edinburgh cotemporary. The following is lengthy, but the cases shew the importance of attention to the minutia of medical evidence. Their peculiar novelty also renders them more interesting.

The first case is that of Ann Rennie, or Pollock, who resided at Gifford Park, at the south side of Edinburgh, whose husband was tried in the High Court of Justiciary, 13th Feb., 1826, and was convicted of having murdered her, but contrived to strangle himself in jail previous to the day of his execution.

The body of this unfortunate woman was inspected by Mr. Newbigging and myself, on the 13th November, 1825. We were informed of her having died suddenly. She seemed to be about fifty years of age, of stout form, of very low rank, having lived in a small, dirty, ill-furnished house, having only some shavings and straw upon the floor, covered with a rug, for a bed. The clothes in contact with the private parts were stained with blood. No appearance of injury could be perceived on any part of the body externally. But upon separating the *labia pudendi*, a wound about an inch and a quarter in length was observed upon the inner side of the right nympha. This wound was evidently recent, its surface being covered with coagulated blood. Externally, it consisted of a remarkably clean, straight incision, parallel with the nympha. Internally, the finger could be introduced in four different directions, to the depth of about 2 1-4 inches in each; upwards and backwards towards the division of the iliac artery; backwards towards the tuberosity of the

ischium; laterally towards the hip-joint, and upwards towards the *mons veneris*. In each direction the wound was of nearly the same diameter, which readily admitted the finger, and had distinctly an obtuse termination. By injecting warm water into the large vessels, we found that none of them had been wounded, and the penetrating instrument seemed to have been forced only through the cellular tissue. The weapon had passed up to the peritoneum at the right side of the pelvis, under which there was a considerable effusion of blood, but had not penetrated it. Another very small, but also very clean external incision was observed at the side of that above described.

The cavities of the cranium, thorax, and abdomen, were each examined, and their contents found to be quite healthy and natural.—The hemorrhage, therefore, which had taken place from the wound, was the only cause which we could assign for her death; and this, we knew from the nature and structure (erectile spongy tissue) of the parts cut, must have been profuse.

Respecting the probable instrument with which this wound had been inflicted, it was obvious from the cleanness of the cut, that the external part of the incision had been made with a remarkably sharp-edged instrument; and from the very obtuse termination of each of the internal wounds, their small depth, and the absence of any injury of the important neighboring parts, it was highly probable, that tho' the instrument that inflicted the wound must have had a very sharp edge, it had a round or blunt point. Now, the only very sharp-edged instrument which I conceived such persons were likely to have possessed, was a *razor*. This instrument has also a blunt point, and could not be inserted to a greater depth than two or three inches, on account of the fingers holding its blade in so using it. I also conceived, that after the external part was cut, any sort of knife could have been thrust into the parts, so as to have formed the wound above described. This I verified by experiment with a razor upon the dead body.

It was proved by evidence, at the trial of the husband for this horrid crime, that two old rusty table-knives had been found in the house, as also two *razors*. One of these razors had its blade and handle covered with blood, and was found concealed in a piece of green cloth. These particulars rendered it almost certain that this had been the weapon used; so that the nature of the wound previously pointed out the probable instrument with much accuracy; though the circumstance of such having been found in the house was then quite unknown to the medical witnesses.

In this case, two other points occurred for the consideration of the medical jurist. Could she have inflicted this wound herself? Several circumstances which appeared in evidence, rendered this impossible; 1*st*. She was in a state of intoxication at the time; 2*d*. Her husband was in the house along with her,—saw her state,—went for a surgeon, (Mr. George White,) and never alleged this at the time; 3*d*. No lethal weapon was found near her; 4*th*. The *pu-*

*dendum* was a very extraordinary place for a suicide to inflict a wound.

It was also alleged and plead for the prisoner, that she had fallen upon a piece of broken earthen ware and cut herself. Could this wound, then, have been occasioned by such an accident? It was impossible to conceive that any broken piece of earthen ware in common use could, by the woman accidentally sitting down upon it, have inflicted such a clean external incision, and produced the wound in the different directions above described. Such a portion of earthenware, if sharp pointed and advantageously placed, might certainly have produced a pretty severe wound of the part; but it would have been a *lacerated* wound, not of any great depth, and not larger internally than externally, and in no part greater than the size of the wounding body; and it was very improbable that it would have had different directions internally.

The second case, which is very similar to that just detailed, is that of Mrs. Bridget Calderhead, who resided at Dunbar Street, near the Canal Basin, and whose sudden death was occasioned by a wound received on the morning of the 1st January, 1831. Mr. Mitchelhill, surgeon, had been called in to see this unfortunate woman soon after the accident, but found her dead when he arrived. At the request of the Sheriff, I accompanied Mr. Mitchelhill in the examination of her body, which we performed on the afternoon of the 1st January, in the Police-Office, to which place her body had been carried.

We found the body of this woman dressed in her ordinary day clothes, and covered with a blanket. We removed her clothes very carefully. They consisted chiefly of a printed cotton gown, two flannel petticoats, (one blue, the other white,) and a shift. These seemed almost quite new, and had no wound or tear in any of them, with the exception of the blue petticoat, in which there were some small worn holes. The lower part of all these garments had been drenched with blood, with which they were still wet.

We then discovered that the hemorrhage had proceeded from a wound upon the middle of the left *labium pudendi*. Externally, this wound consisted of a very clean incision about three quarters of an inch in length, having a straight direction parallel with the margin of the *labium*. When the finger was introduced into this wound, it entered into a bloody cavity, sufficient to have contained a small hen's egg; and from this cavity the finger passed to a greater depth in three different directions,—viz: upwards towards the under part of the *symphysis pubis*,—downwards towards the *perineum*, and backwards by the side of the vagina and rectum. Its greatest depth at any of these parts was between two and three inches. When the internal part of the wound was laid open, the divided orifices of several pretty large arteries and veins were seen, and particularly the divided extremities of the large artery going to the clitoris. The orifices of these vessels, as well as the internal surface of the wound, had the appearance of having been very clean cut by a sharp in-

strument. I removed the wounded parts, and preserved them in spirits.

On the back part of the head there was the mark of a contusion, which had occasioned the extravasation of a small quantity of blood, upon the anterior surface of the brain. The cavities of the chest and abdomen were quite natural.

There could be no difficulty in this case in ascribing death to the excessive hemorrhage occasioned by the wound at the *labium pudendi*. We therefore gave this as our opinion as to the cause of death. The other question then arose, What was the probable instrument and manner in which the wound had been inflicted? From the straight, very clean incision externally, in length corresponding exactly to the breadth of the knives in most common use, as well as from the extent, cleanness of the wound internally, and its different directions, it appeared pretty evident, and most probable, that it had been inflicted by some kind of knife; and, indeed, it obviously could only have been produced by several thrusts of a knife in different directions. Some pieces of a broken wine-glass, however, had been found adjoining to some of the blood the woman had lost at the foot of the stair where she had received the wound. It therefore became a question of importance, whether or not the wound could have been occasioned by her having fallen upon these broken pieces of glass?

1. Let us consider, Is it *physically possible* that any of the portions of the broken wine-glass, or of any wine-glass in common use, could have made such a wound? A portion of glass capable of forming such a wound must have been between two and three inches long, about three fourths of an inch broad, having a sharp cutting edge, and some degree of point; and it must also have possessed sufficient strength to permit its having been moved about and thrust in different directions, without breaking. To form such a piece out of a common wine-glass, is evidently beyond the utmost ingenuity of man; far less, then, could such a portion have been formed by accidental fracture.

The broken portion of glass found, consisted of the stalk of a common wine-glass without the foot, having at its upper part the bottom of the cup of the glass, of about an inch in diameter, attached to it transversely. Nearly the whole of the cup of the glass was broken off, leaving only a few fragments of the sides projecting upwards from the bottom which remained. The part of the stock of the glass which remained, was about an inch or an inch and a half in length, and its lower part had been clean broken across, leaving no sharp point. It was, therefore, quite obvious that this fragment of glass was completely incapable of forming the wound in question; for, the length, form, and sharpness which were requisite, were completely wanting; and any wound which could have been occasioned by it, must have been quite different in its character. A wound from such a piece of broken glass would have been a *lacerated wound*, not a *clean incision*, not larger internally than externally, and could not have had several different directions internally. The

upper end of the glass would have made several small lacerated wounds, while the lower end could not have made any wound at all. I therefore came to the conclusion, that it was physically impossible for the wound in question to have been produced by any portion of a broken wine-glass, such as that found.

2. But supposing that it had been physically possible for such a wound to have been occasioned by a fragment of broken glass, was it in any degree *probable* for it so to have happened in this particular case? In order to have accomplished this, the requisite portion of glass must have been standing ready to receive the fall of the wounded part upon it; the person must have either sat down, or fallen forward upon it, and her clothes, at the time, must have been completely out of the way, as there were none of them wounded; and moreover, the penetrating piece of glass must have thrust itself in different directions, making clean incisions internally as well as externally. So that a concurrence of circumstances highly improbable, nay, almost miraculous, would have been required, in order that the wound in question could have been occasioned accidentally.

From a careful consideration of the foregoing circumstances, I came to the conclusion, that it was neither physically nor morally possible that the wound received by this unfortunate woman, could have been caused accidentally by her having fallen on the portion of wine-glass alluded to; and such, I believe, were also the opinions of Mr. Mitchelhill, and of Dr. Christison, who gave his opinion on the case at the trial. But it could not be denied *to be within the verge of possibility*, that the wound might have been occasioned by her having fallen upon some other piece of glass or sharp body, and therefore we each, individually, thought proper in giving our evidence at the trial, to qualify our opinion upon this point, by saying that we considered it to be *scarcely possible, and very improbable.*

I was also asked at the trial, whether or not this wound could have been produced by her having fallen accidentally on a pair of scissors; to which I stated, that I did not think it could by any of the scissors in common use. For it is obvious that, to have produced such a wound, the blade or blades of the scissors, when together, must have had the sharpness of a knife, as also the requisite length and breadth; besides being in an erect position when fallen upon, and afterwards moved in different directions to form the internal wounds; a combination of circumstances which, as already mentioned respecting the glass, I conceived to be nearly impossible. I may add, that neither scissors nor pockets were found about the person or clothes of the woman.

By the evidence adduced at the trial of two young men, brothers, of the name of Duncan, for the murder of this woman, it was obvious she had received a wound at the first floor of a common stair, almost immediately after which, she was precipitated headlong to the bottom of the stair. When she was there found, upon being set up, blood was observed trickling down her legs. Much stress was laid by the counsel for the panels, upon there having been no blood seen upon the stair. But when it is recollected that she had on her two

thick flannel petticoats, a gown and shift, which were each drenched with blood, it is obvious that the clothes, absorbing the blood when it first flowed, and her rapid progress head forward down the stair, easily explain this circumstance.

The above are two cases very similar in their principal features, and appear to me to be highly interesting in a medico-legal point of view. From the details here given, it is obviously necessary, in such cases, for the medical jurist, to form an accurate opinion whether the death had been occasioned by violence or by natural causes; and, if by violence, to say whether most probably by accident, suicide, or murder. These form considerations of the highest importance to medical men, as upon their evidence the lives of others frequently depend.

In the above cases, it is also obvious, how very accurately the nature of the wound may point out the probable weapon of its infliction; and how very important this circumstance is, in establishing the criminal design with which such wounds may have been inflicted.

In both of the above cases, I removed and preserved the wounded parts, by cutting out along with them a considerable portion of the soft parts; at the same time carefully preserving entire the external wounds. This I consider to be a matter of considerable importance in all such cases; 1*st*. That the wounded parts may afterwards be examined more minutely; 2*dly*. That any lethal weapon or other sharp body afterwards found and supposed to have occasioned the wound, may be compared with it; and 3*dly* That the nature of the wound may be seen by any other medical jurist who may afterwards be consulted in the case, either by the crown or in behalf of the accused.

Before concluding, I shall make a few remarks on wounds inflicted in the situation of the cases just detailed. In both the above cases this part of the body seems to have been selected by the murderers to effect their design secretly. For in both, particularly in the first, the wound was concealed to a superficial observer. And they may have had an idea, from the frequency of "flooding" in females, that their deaths might have been supposed to have happened either from this cause, or by accidentally injuring themselves by sitting down upon some sharp body. For, it is a curious fact, that in both cases, the probable murderers* were the first to go for medical aid to the deceased.

Both cases also show, that wounds of the external parts of generation in the female may prove fatal by excessive hemorrhage; the peculiar structure of the parts consisting of erectile spongy tissue, which is very vascular, giving rise to a continued, steady, though not very rapid, flow of blood.

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*Though the Duncan's got off by a verdict, by a plurality of the jury, of "not proven," yet there could be very little doubt of the guilt of one of them. It was impossible, however, to ascertain which, so that both were transported *for assault*.

In both cases the defence set up by the panel's counsel of the deceased having cut themselves by having accidentally sat down upon broken sharp bodies, was certainly plausible, and could only be controverted by the careful examination of the nature and form of the wounds, and a comparison of them with the alleged inflicting bodies. In both cases this was of great importance, as the deceased did not live to narrate the causes of their wounds; and in both, it appears to me, that the inferences deduced were beyond the possibility of doubt.—*Edin. Med. and Surgical Journal, July*, 1831.

12. *Case of the successful treatment of Snake-bite by cupping glasses.* (*Transactions of the Medical and Physical Society of Calcutta*, vol. iv.)—Mr. Clark, assistant surgeon in the Bengal service, has related the following instance of the successful application of Dr. Barry's treatment against the effects of poisons introduced into an external wound.

A fine healthy youth, fourteen years of age, was bitten at 10 6. A. M. near the bend of the right arm by a snake, the species of which could not be ascertained. He was immediately conveyed to a set of "Snake-Doctors," who, after practising their quackery for five hours to no purpose, directed him to be taken to a European surgeon. Mr. Clarke, who saw him immediately after the native doctors gave him up, found him affected with stupor, insensibility, laborious breathing, extreme feebleness and rapidity of the pulse, great expression of anxiety and distress, constant efforts to expel frothy matter from his throat, and inability to articulate. The wound was situated a little below the bifurcation of the vein at the bend of the arm, extended horizontally half an inch under the skin, and a slight elevation was perceptible over its course, which was paler than the surrounding integuments, so as to present the appearance of a splinter of fir under the skin. The adjacent integuments to the distance of two or three inches were tense and painful. The wound was immediately scarified, and a ligature applied above the elbow. At the same time two attempts were made to administer ammonia, but without success, as the muscles of deglutition were thrown into violent convulsive action, producing increased difficulty of breathing. Mr. Clarke then resolved to try the effects of cupping-glasses, and immediately applied one in the usual manner. After it had been applied for an hour and a half, with occasional short intervals, a manifest improvement had taken place. This was seven hours after the bite. He was more composed, and expectorated less; the pulse was fuller, and the sense of suffocation less urgent. The cupping-glass was now removed, as very little blood had been drawn by it; and ammonia was administered from time to time, but at first with difficulty. In the course of another hour he could stand up, and soon afterwards he was able to walk. Twelve hours after the bite, the bandage having been still kept on the arm, he complained only of drowsiness and difficulty in articulating. In twenty hours the drowsiness continued, the eyes were dull and injected like a person recovering from intoxication, and there was indistinctness of vision. The arm from which the lig-

ature had been removed a short time before, was painful near the puncture, and on the seat of the ligature. Next day he was quite well, after a long and refreshing sleep.

13 *Culpable Abortion.** In the following case there are some facts of interest, and some points for criticism, notwithstanding the high rank which the reporter has attained in forensic medicine.

Messrs. Foderee and Ristelhueher having repaired to the house of the deceased, on the 7th March, 1822, they found the body of Catharine S. extended on a table, and already exhibiting marks of incipient putrefaction, although death had only taken place the preceding day, after a short illness. On examination, there was nothing particular observable in the chest. In the abdomen, the peritoneum was found inflamed, and some spots of inflammation on the mucous membrane of the stomach and bowels. In the neighborhood of the uterus, there was a sanguineous effusion, with some clots of blood, in the midst of which was found a fœtus of about 60 days' growth, with its umbilical cord. The womb was flattened, red, and inflamed. On more minute examination, it was found to be ruptured, the opening being about the size of a three franc piece. The internal surface of the uterus was also inflamed. The membranes of the fœtus were found perforated in two places—near the cervix uteri, and opposite the rupture in the parietes of the uterus, through which the fœtus had escaped into the abdomen. Nothing remarkable about the external parts of generation.

The medical commission called before them and examined several witnesses, by which it appeared that a midwife had been closeted with the deceased a day or two previous to her death, and had made use of a syringe with a long ivory pipe, which syringe was produced. Shortly after this interview, the deceased discharged a quantity of black blood from the vagina, and was seized with excruciating pains, which continued till death took place. From these data the Reporters came to the following conclusions:—viz. 1*st*. That the deceased died of a violent inflammation with rupture of the uterus, followed by expulsion of the fœtus into the abdomen. 2*dly*. That this inflammation and rupture being rare accidents, and not likely to take place, except as the effects or consequences of a grave malady, in the last stage of utero-gestation, it was probable that they were, in this instance, the result of violence, from the forcible introduction of the pipe of a syringe into the os uteri, and the injection of some acrid and stimulating liquid into the cavity of that organ.

The jury found the midwife guilty, and condemned her to ten years' imprisonment.

Some strictures are made by the French Journalists on the testimony of Foderee. They observe that the medical man has no right to call or examine witnesses, in cases of this kind. He should confine

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*Rapport sur une provocation d'Avortement par M. Foderee. Gazette de Sante, November, 1824.

himself to a rigorous examination of the body, aided by the light of physiology and pathology, leaving all matters of moral evidence to the investigation of the civil magistrate. This may be a good general rule; but we think there are many exceptions to it. For instance, in the above case, had no information of instrumental interference been obtained, there was nothing in the body which could have authorised the surgeon to pronounce upon such interference. The rupture of the uterus was not considered as resulting from the operation of the instrument, but from the contractile efforts of the organ itself—and the rupture of the membranes opposite the mouth of the womb might surely proceed from the same cause. It was, therefore, the moral evidence that decided the question. We read lately of a case of spontaneous rupture of the uterus, at an early period of utero-gestation, though we cannot recollect where. This early period, therefore, is no proof of criminal interference, though, backed by the moral evidence, it becomes a very strong presumptive one in the present instance.

The case is otherwise instructive, as showing the danger of procuring abortion by criminal interference.

14. *Hæmatemesis cured by Emetics.** The practice of giving emetics in vomiting of blood is not new—but it is very rarely put in force. There is something repugnant to the feelings, or at least to the preconceptions, in giving an emetic to a man vomiting or spitting up quantities of blood. But we are, as yet, very imperfectly acquainted with the modus operandi—or even the *effects* of medicines on the human frame. Many years ago we saw a surgeon, by no means well versed either in therapeutics or pathology, exhibit a scruple of the sulphate of zinc to a man who had vomited up nearly a chamber-pot-ful of blood, and who appeared nearly in articulo mortis. The patient vomited twice or thrice after the medicine was exhibited—but little or no blood appeared in the ejected matters, and he quickly recovered. We confess that we have not had courage enough to pursue the same practice since.

Dr. Sheridan informs us, that his father, who practised medicine with repute in the county of Cavan upwards of half a century ago, was in the habit of giving emetics of ipecacuan in cases of hæmatemesis, and that they never disappointed his expectations. Dr. Sheridan, the younger, was deterred from following his father's practice for many years; but having witnessed some fatal cases of the disease in question, he at length ventured on the remedy, and the present paper contains the particulars of five cases successfully treated. We shall give a brief outline of two or three of these cases, as they may inspire confidence in the treatment of a formidable disease.

*Case* 1. Jane Halpen, a young woman, complained of great oppression and pain about the præcordia, attended with violent palpitations.

*Dr. Edward Sheridan. Dublin Trans. vol. iv.

When our author first saw her, she had thrown up much dark coloured blood; but the vomiting had stopped, though the præcordial oppression continued. He did not, therefore, give the emetic. On the third day, the hæmatemesis returned with violence, and was followed by great debility. On the third day from the last mentioned attack, it recurred for the third time, and was excessive in quantity. He now exhibited thirty grains of ipecacuan. The vomiting ceased for a few minutes, but soon came on again, and blood was discharged, both grumous and fluid. She now lay in a state of the most alarming debility. No more blood issued—dropsy supervened, and was removed by aperients and diuretics.

*Case* 2. A builder, much exposed to the atmospheric vicissitudes, had not enjoyed good health for ten years past. He was subject to much pain and oppression about the præcordia. On the 24th December, he was seized with hæmatemesis to a great extent, attended with much palpitation, and pain across the præcordia. He had ejected more than three quarts of blood, when our author ordered an ipecacuan emetic. It rested some minutes on the stomach, and then brought off about a pint of blood, at three or four operations. "Here all the symptoms subsided: he found himself perfectly relieved: heat was gradually diffused over his whole surface, which had been cold before. He fell asleep: gentle perspiration ensued, which continued a good part of the next day: his pulse became full, soft, and regular, and he felt himself, he said, more free from pain, oppression, or sickness, than he had been for years before. On the day after, I gave him a mercurial purge, which brought away a great quantity of such matter as he had vomited, with this difference, that it was blacker, and resembled the discharges in melæna. He continued to improve, but was still weak: in this state, contrary to the most positive injunctions, he made too free, and the pain across the præcordia, the oppression, &c., returned. Under these circumstances I did not hesitate to repeat the ipecacuan: all these symptoms vanished, and he since continues to improve."

*Case* 3. This was a relapse of the first case, after an interval of three years. When our author arrived, the poor woman had vomited more than three quarts of blood. Her anxiety was extreme—pulse scarcely perceptible—palpitation great. With difficulty an emetic was administered. After taking it, her stomach became quiet for ten minutes. She then threw up a quantity of watery and mucous fluid, but no blood. "Immediately after, all the symptoms, as if by magic, ceased."

"These cases," says our author, "with the two others which I observed in the country, have made such an impression on me, that I never can hereafter hesitate for a moment to have recourse to the ipecacuan emetic in hæmatemesis. I do not mean by this term a mere vomiting of blood, which may be produced by various causes, and in some cases of which emetics might prove very prejudicial, but the true hæmatemesis, which I think will always be sufficiently distin

guished by the symptoms which have been above described."—*Medico-Chirurgical Review.*

15 *Recto-vesical Lithotomy.*—This operation was first practiced in France, where it has been very coldly received. It was imported into Italy, and there it seems to take root and thrive. It has been practiced at Turin, Genoa, Milan, Pisa, but in different modes. Some surgeons have abandoned it after trial; others have written against it on theoretical grounds, and without trial; while the great number who have performed it, give it the preference to either the lateral or the high operation. There are some solid and important facts connected with this subject, which are not undeserving of attention. The following are some of them. Of 69 who have undergone the recto-vesical operation, 13 have died, or rather less than one in five. Of these 13, seven are asserted to have died of affections totally independent of the operation, 56 have been cured; but out of these 56, there are eight with fistulous openings. Of these eight, one had the lower part of the bladder (le bas-fond de la vessie) incised. Forty-eight therefore have been cured without fistula, in four of which the "bas-fond" had also been injured. The period of recovery varied from ten or twelve days to seven months. Seven were cured between the eighth and fifteenth day; twenty-eight between the fifteenth and thirteenth day; ten between the 30th and 60th day; and eleven between the 60th day and seven months.

The principal advantages of the recto-vesical operation are considered to be—the impossibility of wounding the pudic artery—the absence of hæmorrhage during and subsequent to the operation—the facility of extracting the largest calculi—the little risk of urinous infiltrations. On the other hand, the serious inconveniences of this operation are candidly stated, and are as follows:—the wounding of the seminal vessels—and the chance of recto-vesical fistula. It is yet to be proved that the first accident entails impotence.* In respect to the latter, it is said that it will be very rare where the incision does not go beyond the limits of the prostate gland. It will be frequent, but not inevitable in those cases where the incision reaches the lower part (bas-fond) of the bladder. In the lateral operation, there is little danger of either fistula or wound of the seminal vessels; but then there are other dangers and inconveniences, viz: 1st, Injury of the rectum—an accident by no means extremely rare, even in the hands of the most expert operators. 2d, Hæmorrhage, examples of which are, unfortunately, but too frequent; and generally mortal where the pudic artery is divided. 3d, The impossibility of extracting a very large stone by the lateral operation. 4th, The greater

* We know an instance where, after a successful lithotomy in the lateral way, the seminal vessels have been obliterated, and all communication with the urethra cut off. The inconveniences are rather distressing though the gentleman is upwards of seventy years of age. It is probable that inflammation about the verumontanum was the cause of this occlusion of the seminal vessels.—*Rev.*

mortality by the lateral, than by the recto-vesical operation. This parallel M. Breschet has drawn from the memoirs of Vacca and others, in Italy, and he comes to the conclusion that—the recto-vesical operation is, or appears to be, preferable to the lateral; and that it ought to be more frequently practiced than it now is in France.—*Arch. Gen. July*, 1824.

P. S. As many of the readers of this series may not be acquainted with the method of recto-vesical operation, we shall give a very short description of it in this place, in the words of a transatlantic writer, Dr. Muter, of New-York, formerly of Wisbeach, in Cambridgeshire, who has published a little work on the subject of Lithotomy, which does much credit to his judgment as an ingenious surgeon. There are two modes of performing this operation, one of which may be called the high, and the other the low recto-vesical incision. The former we believe is now seldom practiced. It consists in an incision made through the rectum and bladder, above the sphincter of the one, and prostate of the other, into the slit or groove of the staff, in the place where the bladder is punctured for suppression of urine; cutting a little to one side, to avoid wounding a small artery which runs along the middle of the anterior surface of the rectum.

"There is another situation," says Dr. Muter, "towards the verge of the anus and perineum, where a somewhat different operation may be performed, and a very large stone extracted. If I have maintained that a stone of small size only, ought to be extracted by the last, by this, I now assert that *only a large one* should be extracted."

"We are told by professor Vacca, that the fæces may be excluded from entering the bladder, by this mode of forming a valve of the rectum, opposite the wound in the prostate and neck of the bladder. The incision is to be made anterior to the prostate, and carried through the rectum, urethra, and sphincter of the anus, an inch into the perineum, cutting along the slit in the staff. The surgeon then runs the knife along the groove in the staff, and dividing the prostate and cellular membrane, leaves the rectum uncut. This valve of the rectum extends about an inch lower than the opening into the bladder." Dr. Muter observes, that it must be exceedingly difficult to avoid including the rectum also in this incision, in which case there would be no valve. And even granting that the surgeon succeeds in forming the valve, Dr. M. thinks that it would be in the way of extracting a large stone, forming a stricture of the wound, and impeding the exit of the calculus. Besides this, it would, he thinks, be very liable to be torn. The above objections of Dr. Muter, let it be remembered, are not from actual experience of their validity, but from reasoning on the subject.

16. *Mental Imbecility from injury of a Nerve.*—A young man, fourteen years of age, of plethoric habit and nervous temperament, received an injury on the top of the foot, from a stone thrown with violence by one of his playmates. By this accident a portion of the anterior tibial nerve, situated between the metatarsal bone of the great toe and the adjoining one, was contused. Only a slight degree of pain at first occurred, and that upon motion. About eight or ten weeks after the

accident, the pain increased, accompanied by a slight swelling of the part, and also an extension of the pain to the ancle and leg. Lotions, fomentations, and rest, did no good, and the disease increased in violence, extending up along the trunk of the nerve, and affecting the adjacent muscles with spasms. The constitution now became involved in the irritation; the pulse increased in frequency and force, but the digestive organs continued in good order. The pain extended above the knee, and was almost insupportable. Large doses of assafœtida, conium, and even belladonna, produced no relief. The symptoms became more formidable; the spasmodic action of the extensor longus pollicis pedis, drew the great toe perpendicular to the surface of the foot; and the slightest motion or touch would excite excruciating pain, lasting from three to five minutes. At the end of three months from the accident, the whole nervous system became involved in these spasmodic irritations, and the intellect began to suffer. The unfortunate patient lost the power of reasoning and recollection; was unable to distinguish visitors, or recognize his parents; in fact, his mind became idiotic. The pain, however, now extended up along and beyond the thigh, affecting spasmodically the muscles of respiration. Though his distress was most acute, yet he gave no utterance to his feelings. "While the paroxysms were on him, he would roll his fist, and imitate the actions of a pugilist, but with much greater violence and rapidity, often striking his nearest and best friends, and all around him." It was now determined to make a division of the anterior tibial nerve, as a last resource. It was accordingly divided above the ankle, from a belief that it would more effectually cut off the connection between the injured part and the nervous system at large. An incision was made about two inches in length, just on the outside of the tibia, and a separation made between the extensor longus pollicis pedis and the tibialis anticus, down to the artery and nerve. The latter was divided by a bistoury, and about an inch of it cut out. The extensor muscle of the great toe became immediately so relaxed, as to allow the toe to resume its natural situation by the side of the other toes. There was also an almost immediate alleviation of all those extraordinary morbid phenomena that had exhibited themselves in the unfortunate sufferer. The local affections became less distressing, and in a short time wholly disappeared. He has since enjoyed good health.

Although Dr. Anderson does not mention anything about the return of sound intellect, we take it for granted that this was the case, otherwise he would not have stated the enjoyment of *good health*. The case affords a curious instance of the power of a local affection in deranging the health of body and mind.—*N. Y. Med. and Phys. Journ.*

17. *Resuscitation.*—Our readers are aware that some discrepancy of opinion prevails respecting the *power* which we possess of restoring suspended animation. If we are to believe the accounts transmitted to the Humane Society, there would seem to be scarcely any limits to this power, in respect to the period which elapses between suspension and restoration of the vital phenomena. Mr. Brodie and some others in this country, on the other hand, are very sceptical re-

specting the said power of resuscitation, after the cessation of the heart's action, which they suppose (from experiments on animals) cannot continue for more than a few minutes after the respiratory function ceases. We confess that, from what we have actually seen of these resuscitations and attempts at resuscitation, (which have been not a few) we are led to the same views as are entertained by Dr. Paris and Mr. Brodie. Our contemporaries of the North are of a different opinion, and they have published an analysis of Dr. Roesler's thesis in support of their opinion. Of this analysis we shall present the prominent features, being desirous that the means of saving human life should neither be depreciated nor rated too highly.

The first inquiry instituted by Dr. Roesler, was to determine whether, in death by submersion, the air passages are really obstructed by mucus and water; a subject which has occasioned much controversy. The result of 45 experiments made by Dr. R. was, that in every instance a very small quantity of frothy mucus might be seen about the bifurcation of the trachea; but no water whatever; the quantity of mucus being wholly insufficient to produce the slightest obstacle to artificial inflation of the lungs. The attempt at washing out the mucus by means of warm water, was not merely useless, but injurious. Not so the following:

"This process was instituted, in order to determine the average number of recoveries by the inflation of temperate air, and the longest period of submersion after which animation might be restored; with the view of afterwards comparing with these *data* the corresponding results obtained with heated air. The plan pursued was the following: As soon as the animal was removed from the water, it was carefully dried, laid in a warm, but well-ventilated place, and rubbed, and finally swathed in flannel. The artificial inflation was then immediately begun, and was continued for half an hour or three quarters of an hours; after which, if no signs of resuscitation appeared, it was abandoned. At the same time the frictions were frequently resumed, the body was kept well warmed, and as soon as any sign of returning life appeared, stimulants were introduced into the stomach. The only important particular which has been omitted in his description, is the number of inflations; but as far as can be gathered from the details of the experiments, they appear to have been about twenty per minute."

The average number of recoveries was three to eight. And next comes the great question as to the period of submersion. We have already stated the opinion of Mr. Brodie and Dr. Paris. It may be, that the latter author has thrown too much of an air of ridicule over a grave subject, by comparing the stories of divers, and the reports from humane societies, with the ancient tales respecting "the nymphs and mermaids whose residence is in grottoes beneath the waves of the sea." But on the other hand, our northern contemporaries are forced to admit "that the reports which have emanated from humane societies, and various other quarters, are too sanguine in their expectations of success in cases of long-continued submersion." The first train of experiments were three in number—two on rabbits and one on a cat. The periods of submersion were 5 3-4, 9 1-2, and 11 3-4 minutes, and

in all the three cases, resuscitation was effected. But, *audi alteram partem.* "He several times failed when the animals were taken out of the water instantly after they seemed to have expired." It appears to us, therefore, that as the above 3 experiments were the only ones our contemporaries could select out of forty-five, which were at all in support of their doctrines, they have very little indeed to boast of, granting that no fallacy crept in, or no coloring was given to the said experiments—fallacies and colorings which they themselves acknowledge to have often disfigured reports in this country, and which may (without prejudice be it spoken) occur in the reports of men in other climates also.

A part of the investigation relates to the relative value of cool and warm air in the treatment of suspended animation. The results appear favorable to the employment of heated air for the inflation of the lungs; "but enough has not been done to determine its precise value."

We have only one more observation to make on this subject, namely, that men are not cats or rabbits. Experiments on the inferior animals will rarely apply to the human species. We have seen rabbits digest a good belly-full of parsley with both par vagums cut, and streams of electricity passing constantly along the nerves. But how would such an experiment succeed in man?—*D. Roesler's Inaugural Dissertation.—Edinb. Journ.*

18. *Tympanitic state of the Pericardium.*—Mr. Scott of the Haymarket, aged about 47, had, for three or four years, been declining in health, but had not been under regular medical superintendence until a few weeks before his decease. No regular history of the complaint therefore could be obtained. He stated however, that his appetite and strength had gradually declined, but his chief complaint was, a fluttering, a palpitation, and a sense of anxiety about the region of the heart, with disturbed sleep, and frightful dreams. When seen a few weeks before death, his countenance was like that of a person in a state of anemia, except that there was also a chlorotic tinge in the skin. The pulse was very feeble, quick, and irregular; there was a tendency to œdema about the ancles; the appetite was almost entirely gone, and the patient felt approaches to syncope, on using any exertion, or ascending stairs. His mind was desponding, and temper irritable. The motions from his bowels were perfectly healthy. The chest in every part sounded remarkably well. In the region of the heart percussion elicited as clear a sound as in any other part of the chest. The impulse of the heart against the ribs was very feeble, and scarcely audible. It was also irregular, in correspondence with the state of the pulse. The patient was under the care of Mr. Fincham, of Spring Gardens, and was visited successively by Dr. Hooper, Dr. Macmichael, and Dr. Johnson.

When the above symptoms and phenomena were ascertained by the last-mentioned physician, (not in consultation with the others,) he gave it as his opinion to Mr. Fincham, that the patient labored under disease of the heart; and that the nature of the lesion was probably

a weakening and degeneration of the muscular structure. In a few days after this examination, the patient suddenly died, and the body was examined by Dr. Johnson, Mr. Fincham, and Mr. Henry Johnson.

Dissection, 13th February, 1825.—The body extenuated, but still there was some peculiarly yellow fat on the chest and abdomen. The muscles, though wasted, were of a vivid red color. All the organs in the abdomen were sound. On opening the chest, the lungs presented a beautiful blue appearance, sparingly mottled with white; they were very sound. Between the two lungs there presented itself a pellucid membrane distended with air. This was found to be the pericardium, reduced to a most extraordinary degree of tenuity, and distended with a very considerable quantity of air. The heart was small (not half filling the pericardium) and extremely degenerated in substance, a great part of its muscular structure being converted into a kind of fat. The whole was so lacerable as scarcely to bear handling. The parietes of the left ventricle were not more than a quarter of an inch in thickness; the internal surfaces of the cavities were pale, wasted, and not containing a single drop of blood. Neither was any blood to be seen in the large vessels issuing from the heart. There was nothing particular in the valvular structure of the organ.

Dr. Johnson has met with several cases where the heart was in this degenerated condition, but never before observed such a distention of the pericardium by air. It is quite evident from the size of the pericardium, and its extreme tenuity, that this collection of air must have been of some standing. This phenomenon accounts for the region of the heart being as sonorous as any other part of the chest, which is not usually the case.—*Med. Chi. Rev.*

19. *Dropsy in Pregnancy.*—Dr. Felici, of Milan, relates the case of a woman, thirty-five years of age, who considered herself pregnant in December, 1817, soon after which a tumefaction appeared in the feet, and spread to the thighs, pudenda, loins, and abdomen, attended with much thirst. On the 2d of February she was seized with fever, and acute pain in the left hypogastric region, with numbness of the corresponding thigh. These symptoms were combated by antiphlogistics and digitalis, except the thirst, which continued insupportable. The œdema increased; the swelling of the abdomen became enormous; the desire of making water violent and painful. The pain in the leg and thigh had greatly increased; there was difficulty of breathing; palpitations; a dry cough; wasting of the upper extremities; frequent pulse; sense of suffocation upon the slightest motion; puffiness of the face. Such was the poor woman's state, when seen, for the first time, by Dr. Felici, on the 6th of March. The doctor suspecting retention of urine, introduced the catheter, and drew off 13 *or* 14 *pints of urine!* This operation, repeated twice in the same day, produced the evacuation of an equal quantity. Next day the symptoms were mitigated: the catheter was passed twice. The fever and thirst continued; but the pain in the side was gone; the thigh could be moved; and the œdema of the lower extremities greatly diminished. On the 8th a purgative was taken, which procured several watery evacuations; but

no urine discharged. The catheter again drew off as large a quantity as on the 6th. About noon labour came on; the fœtus and placenta were thrown off without accident, and there was no subsequent lochia.

The catheter was used every two hours on the 7th, 10th, 11th, and 12th. On the 13th the abdominal swelling was entirely gone, as was that of the right thigh. It was not till the 18th that the painter was able to make water naturally, for the first time, and by the 31st was able to lay aside the catheter.

This was one of those cases which we occasionally see of immense distention of the urinary bladder. There was a man last year in St. George's Hospital, who was supposed to labor under ascites, and paracentesis abdominis was in contemplation, when the house-surgeon happened to introduce a catheter, and drew off many quarts of water, with immediate reduction of the abdominal swelling.—*Ib.*

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## II. ANALYTICAL.

1. *On the Origin of Voltaic Action.*—M. Matteuce, a celebrated French Chemist, contends, that the mere contact of different metals, is sufficient for the development of electricity, although he admits that chemical action exerts an influence over this force, just as heat does in thermo-electric experiments. In order to obviate every suspicion of chemical action, he washed a frog in distilled water, freed from air, and thus removed all animal fluid. It was then suspended by the nerves from the zinc wire, the jar filled with distilled water, and then with pure hydrogen; but on touching the limbs with the copper wire, the same contractions took place as in common air.

This question is now dividing the philosophers of Europe, and is certainly a very important one.—*Journ. of Royal Institution, May*, 1831.

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2. *Conducting power of Liquefied Gases.*—By making liquefied sulphurous acid gas, a part of the circuit in a galvanic battery of 250 pairs of plates, shocks were received, water was decomposed, and the galvanometer was acted on, as if a continuous

metallic communication had existed. Liquid sulphurous acid is therefore an excellent conductor of electricity. Cyanogen, on the contrary, was found to be a perfect non-conductor, even to a voltaic current of from 300 pairs of plates. Liquefied chlorine was also found to be a perfect non-conductor of electricity from a battery of 250 pairs.—*Ibid.*

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3. *Generation of Steam by Heated Metal.*—In boilers of high pressure engines, the heat applied to a part not containing water, sometimes raises that part of the boiler to a dull read heat, which suddenly coming in contact with a portion of contained water, generates steam with such rapidity, as to burst the boiler. Mr. Johnson, of Philadelphia, made a number of experiments, with a view to procuring a remedy for this defect. He found by immersing iron, raised to different temperatures, in boiling water, that more steam was generated in a given time, by iron of a red heat, just visible in daylight, than by the same piece of iron raised to a white heat. This was thought to arise from the greater quantity of steam forming an atmosphere around the white hot iron, and thus preventing the water from coming in contact with the iron. The steam generated, bears a direct relation to the weight of the metal, being about one pound of steam for every nine pounds of iron. In comparing cast iron with malleable, it was found that cast iron raised to the same temperature, generates more than wrought iron, being about one pound of steam for every eight pounds and a quarter of iron.—*Silliman's Journal, Vol. XIX. p.* 292.

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4. *Spontaneous Combustion of Pulverized Charcoal.*—The occurrence of spontaneous combustion in finely-pulverized charcoal, was so frequent, that a series of experiments seemed to be peculiarly called for to determine the cause. These experiments were made at one of the Polytechnic schools of France, in 1828, and the result is as follows:

Charcoal in an open vessel, undergoes spontaneous combustion, while a portion of the same kind of charcoal, of equal weight, in a perfectly tight vessel, remains unchanged; and the inference is, that the absorption of atmospherical oxygen is essential to the combustion.—*Annales de Chimie.*

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5. *To obtain Selerium from the Sulphuret.*—Powder the sulphuret finely, and mix with it eight times its weight of the peroxyde of manganese, and heat the mixture in a retort; the sulphur of the sulphuret is changed into the sulphurous acid, by the oxygen of the peroxyde, which latter is converted into a protoxyde; at the neck of the retort, a sublimate forms, which is *pure* selenium. The sublimate always contains some sulphur, from which it may be freed, by repeated fusion with the peroxyde of manganese, or with caustic potash.—*Journ. of Royal Ins. May* 1831.

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6. *Iodic Acid a test of the Vegeto Alkalies.*—Mr. Serullas has shown, that the smallest quantity of the new vegetable alkalies, may be detected by iodic acid, or by a solution of perchloride of iodine, because of the iodic acid there present, or ready to be formed. The sensibility is so great that the acid may be regarded as one of the most delicate tests in use. The hundredth part of a grain of quinia or cinchonia, dissolved in several thousand times its weight of alcohol, may in this way be precipitated, and the precipitate quickly collected. All the vegeto-alkalies are not equally well tested in this way, but the least sensible is discovered, if one-fifth of a grain is present.—*An. de Chim. Vol. XIV.*

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7. *Influence of occupation on the development of Phthisis Pulmonalis.*—At a meeting of the French Institute, in November, 1830, M. M. Dumeril and Majendie made report on a work of M. Benoiston de Chateaneuf, relative to influence of professions

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in the development of pulmonary consumption. From an account of patients admitted into four hospitals, from 1817 to 1827, the following results were obtained:

1st. *Occupations which expose the lungs to the action of air charged with vegetable particles.* These are starchmakers, bakers, colliers, rag-dealers, cotton-spinners, winders, and silk-reelers.

Of 5829 males, 182 died.
Of 2555 females, 56 died.

Total, 8384. 158 died.

2d. *Occupations which expose the lungs to an air charged with mineral poisons.* These are quarriers, masons and their assistants, stonecutters, plasterers, &c.

Of 5829, 114 died.

3. *Occupations which expose the lungs to an air charged with animal particles.* These are brushmakers, carders, mattrassmakers, hatters, workers in feathers, &c.

Of 1434 males, 64 died.
Of 795 females, 27 died.

Total, 2229, 91 died.

4. *Occupations exposing the lungs to an air charged with offensive vapors.* These are gilders, painters, and the like.

Of 3337, 105 died.

5. *Occupations which expose the body and especially the lower extremities to the action of moisture.* These are bleachers and washerwomen.

Of 2993, 129 died.

6. *Occupations which expose the muscles of the breast and the upper extremities to sudden and very severe exercise.* These are weavers, players, carpenters, cabinet-makers, smiths, farriers, water-carriers, sawers of wood and stone.

Of 554, 120 died.

7. *Occupations which subject the muscles of the breast and arms to constant motion, and the body to a bent position.* These are ac-

countants, jewellers, tailors, shoemakers, fringemakers, lacemakers, lapidaries, workers in embroidery, florists, gloviers, &c.

Of 15,583, 837 died.

Total number of the phthisical patients of the various occupations above named, - - - - 43,001

Total number of deaths in ten years, - 1654.

*Journ. de Chim. Med. Jan.* 1831.

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8. *Twisting of the Arteries.*—This is an operation which is intended as a substitute for the usual ligatures, after amputation, &c. M. Amussat, of the Academy of Science in Paris, tried this twisting (torsion) of the arteries after amputation, in four individuals, with entire success; no secondary hemorrhage occurred. It is said never to be followed by consecutive bleedings, and that it allows the immediate reunion of the parts, in due time. The practice has been adopted, with success, by M. M. Waust and Anciause, at Liege; Friecke and Schreuder, at Hamburgh; and Dieffembach and Rust, at Berlin.—*Journ. Royal Inst., May*, 1831.

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9. *Lithotrity.*—Dr. Civiale communicated to the Academy of Science, (Jan. 24, 1831,) a report of the cases of lithotrity, recently placed under his notice. He attributes the failure of the process, in most cases where failure has occurred, to the imperfection of the instruments employed. He has operated successfully on 152 cases, and has seen other practitioners equally successful in 13 cases.—*Ib. May* 1831.

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10. *New Remedy.*—M. Jumeret Perrault has announced the discovery of a plant in the mountains of Neufchatel, which is a sovereign remedy for pulmonary complaints. He offers it at seventeen pence per package, and supposes it to be a species of *asplenium.*—*Ib.*

11. *Acupuncturation of the Arteries.*—At a late meeting of the Parisian Academy of Sciences, M. Velpeau suggested the acupuncture of arteries as an advantageous substitute for ligature. —*Ib.*

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12. *Action of Oil of Turpentine, Opium, &c. on the Nervous System.*—M. Flourens has lately detailed a series of experiments made by him, on the action of essential oil of turpentine, opium, and alcohol, when applied to different parts of the brain. The operation was performed on rabbits, the cranium and dura mater having been previously removed: in all the experiments he took care to renew the substances as soon as they disappeared from the surface of the organ, by absorption or evaporation. The oil of turpentine applied to the lobes of the brain, produced an agitation, with occasional intervals of repose. Sometimes the animal leaped forward, and at others turned round, in a spiral direction. During the paroxysm, the animal appeared in a state of furious madness, and neither saw nor heard but in the intervals of repose; the faculties of sight and hearing appeared uninjured. On applying the turpentine to the cerebellum, a strong tendency to run and leap, was observed. The effects of alcohol were similar, but less violent, never producing the circumgyration. Liquid opium applied to the lobes of the brain, quickly induced torpor, which continued for some time. Opium applied to the cerebellum, destroyed the equilibrium of the body, and the animal could move only on its abdomen.—*Ib.*

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13. *Lithotomy.*–Mr. Rigal, of the Royal Academy of Medicine, (Paris,) recently extracted a stone from the bladder of a girl, aged 20 years, which weighed ten ounces and five drachms; it filled the bladder, and was removed by the vagino-vesicale operation. In another case he performed the bilateral operation, and met with two adherent sacs, the extraction of which caused a rent in the bladder; the hemorrhage which ensued was arrested by injections of very cold vinegar and water. The patient

recovered. The same operation was performed on a patient aged 55, who died on the fifth day after the operation. The bladder was completely filled with three very large stones, which could not be seized for extraction. M. Amussat suggested, notwithstanding the hypertrophy of the bladder, that it would have been better to have performed the hypogastric operation.

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14. *Polypus*,—M. Rigal applied the ligature with success, to a very large polypus, occupying the left nasal fossa, jutting out of the nostril, and pressing behind on the soft palate, causing the tongue to be protruded out of the mouth, and rendering respiration and deglutition difficult. He did not find the hard knot of *Desault*, so useful as it is represented to be, but gave preference to the fillet of *Sauter*.—*Journ. de Chim. Med., April*, 1831.

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15. *Vanadium*, a new metal found in iron ore at the mines of Fahlun. Mr. Sefstrom is its discoverer, though Bezzelius has particularly examined it. M. del Rio, of Mexico, has also found this metal in some brown lead ore, in the district of Zeinampas. He called it *Erythronium*. The name Vanadium is from an ancient deity of the Scandinavians. Vanadium combines with oxygen to form an oxyde, and also an acid, the salts of which are called *vanadates*.—*Annales de Chimie, XLV.*

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16. *Magnesium*, or the metallic base of magnesia, has been obtained by M. Bussy, of the Academy of Sciences in Paris, by the decomposition of the chloride of magnesium, by means of potassum. The chloride of magnesium may be formed by passing chlorine gas over red hot magnesia; oxygen is expelled from the magnesia, and the chlorine then takes the place of the oxygen, and forms chloride of magnesium. Magnesium is a brilliant metal, of a silvery whiteness, perfectly ductile and malleable, fusible at a comparatively low heat, and like zinc.

capable of sublimation at a temperature very little above its fusing point, and of being condensed in form of globules. It does not decompose water at the ordinary temperature; it oxydises at a high temperature, and magnesia is the result; the oxydatum takes place slowly if the pieces be large, but if the metal be in fine powder, it burns with great splendor, throwing out sparks like iron in oxygen gas.—*Journ. R. Ins. May*, 1831.

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17. *Phosphate of Quinine.*—Dr. Harless, of Bonn, has discovered that the phosphate of quinine is not only more agreeable to the palate than the sulphate, but that by reason, the union of the vegetable alkali with an animal acid (the phosphoric) the medicine is better suited to the purpose of animalization; it combines more readily with the chyme and chyle, and hence is more properly conveyed to every part of the system. The phosphate is best suited to irritable stomachs, and is vastly superior to any other preparation of quinine in such cases. Dose from one to four grains.—*Journ. de Chim. Med.*